



# **HOLDER-WRIGHT PARK DEVELOPMENT**

**November 22, 2016**

**10:00 a.m.**

Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016



**CITY OF DUBLIN, OHIO**

**BID AND CONTRACT DOCUMENTS**

**For**

**Holder-Wright Park Development**

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**SECTION 1**  
**BIDDING REQUIREMENTS**

## **INVITATION TO BID**

Sealed proposals will be received from qualified bidders by:

**City of Dublin, Ohio  
Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016**

until **10:00 a.m.** local time on **Tuesday, November 22, 2016** at which time the sealed proposals will be opened by the **Director of Parks & Recreation**, for the following project:

### **HOLDER-WRIGHT PARK DEVELOPMENT**

All materials and labor necessary for the construction of a parking lot, small pedestrian bridge, restroom facility, specialized form liner concrete work, sidewalks, grading and shaping earth mounds, and landscape installation for the Holder-Wright Park development.

Service delivery shall be in accordance with contract documents.

Bidders shall submit with their proposals a certified check, cashier's check, letter of credit, or a satisfactory bid bond in an amount equal to ten percent (10%) of the estimated value of the contract.

## **ODOT Pre-qualification**

**NOT APPLICABLE X**

Bidders are required to be pre-qualified with the Ohio Department of Transportation. Bidders must present a current approved copy of ODOT Pre-qualification at the time proposals are picked up from City Engineer's Office.

## **General Specifications**

**NOT APPLICABLE**

The general specifications for the Project are the following (as all are in effect at time of awarding of the contract):

- 1). City of Dublin, Ohio Streets and Highways General Provisions
- 2). Sections 200 through 1000 of the *Construction and Material Specifications of the City of Columbus, Ohio*, and
- 3). Sections 200 through 700 of the *Construction and Material Specifications of the State of Ohio Department of Transportation*

Copies of the *Construction and Material Specifications of the City of Columbus, Ohio* may be obtained from:

Director of Public Service  
City of Columbus, Ohio  
90 W. Broad Street, 3<sup>rd</sup> Floor  
Columbus, Ohio

Copies of the *Construction and Material Specifications of the State of Ohio Department of Transportation* may be obtained from:

Ohio Department of Transportation  
Bureau of Contract Sales  
P.O. Box 899  
Columbus, Ohio 43216-0899

## **Contract Documents**

Copies of bid specification and contract documents are on file for review at 6555 Shier Rings Road, Dublin, Ohio 43016 between the hours of 8:00 a.m. to 4:00 p.m. (local time), Monday through Friday, beginning Tuesday, November 8, 2016. Documents are available online at <http://dublinohiousa.gov/bids-and-requests-for-proposals> at no charge. When downloading bid documents from online you must register as a plan holder to receive any addendums that may be issued.

For bids related to all other commodities, services, or projects, Copies of bid specification and contract documents are on file for review at 6555 Shier Rings Road, Dublin, Ohio 43016 between the hours of 8:00 a.m. to 4:00 p.m. (local time), Monday through Friday, beginning Tuesday, November 8, 2016. Documents are available online at <http://dublinohiousa.gov/bids-and-requests-for-proposals> at no charge. When downloading bid documents from online you must register as a plan holder to receive any addendums that may be issued.

**Prevailing Wages**  
**APPLICABLE X    NOT APPLICABLE    \_\_\_\_\_**

Bidders shall comply with Chapter 4115 of the Ohio Revised Code (Wages and Hours on Public Works). Bidders are responsible for verifying that the most current wage rates are utilized in their bids. The successful bidder is also responsible for any changes in the prevailing wage rates or classifications throughout its performance of work on the Project.

#### **Bids and Attached Documents**

Bidders shall submit their bids on the form of proposal provided by the **Director of Parks & Recreation**. Each proposal shall be submitted in its entirety in a sealed envelope addressed to:

**Matt Earman  
Director of Parks & Recreation  
City of Dublin, Ohio  
Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016**

Each sealed envelope containing a proposal shall be plainly marked on the outside as – “Bid for: **HOLDER-WRIGHT PARK DEVELOPMENT.**” The envelope shall bear the name and address of the bidder. If forwarded by mail, the sealed envelope containing the proposal must be enclosed in another envelope and the outside of the envelope must be addressed to and marked:

**Matt Earman  
Director of Parks & Recreation  
City of Dublin, Ohio  
Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016**

#### **BID FOR: HOLDER-WRIGHT PARK DEVELOPMENT**

Bidders shall submit the following with their proposals:

1. Non-collusion Affidavit.
2. Bid Guaranty.
3. List of Subcontractors if applicable.

4. Delinquent Personal Property Tax Affidavit.
5. Affidavit of Authority (if Bidder is a corporation).
7. Experience Record/References.
8. Power of Attorney (if Bidder is an out-of-state corporation).

**The City of Dublin, Ohio reserves the right to reject any and all proposals and to waive any informalities or irregularities in the proposals.**

Bidders may address technical inquiries to:

**David R. Parkinson, P.E.  
Senior Project Manager  
CT Consultants, Inc.  
Northwoods I  
7965 North High Street  
Suite 340  
Columbus, Ohio 43235  
614.779.0016 Direct  
Email: DParkinson@ctconsultants.com**

By order of the City Council of the City of Dublin, Ohio.  
CITY OF DUBLIN, OHIO  
Dana L. McDaniel  
City Manager

#### **INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS**

Immediately notify **Shawn Krawetzki** upon finding discrepancies or omissions in the bidding documents.

**Direct general inquiries and questions to Shawn Krawetzki, City of Dublin at 614-410-4707 or [skrawetzki@dublin.oh.us](mailto:skrawetzki@dublin.oh.us)**

1. Submit written request for clarification, correction or interpretation to the City not less than 7 days before the date for receipt of bids.
2. Modifications to the bidding documents will be issued as Addenda to the specifications and will become a part of the Contract.
3. No bidder shall rely on oral modifications or any other method of clarification, correction or interpretation of the bidding documents. Only modifications set forth in an Addendum will be binding.

**SECTION 2**  
**BIDDING FORMS**

**PROPOSAL**

**HOLDER-WRIGHT PARK DEVELOPMENT**

\_\_\_\_\_ (the "Bidder") submits this Proposal having read and examined the contract documents, including but not limited to the Invitation to Bid; the City of Dublin, Ohio

All bids will be based upon elements indicated within the Drawings and Specifications. All changes to actual length, either additions or subtractions, will be through Change Order(s) using unit price(s) provided by contractor on proposal form.

Addenda Number

Date of Receipt

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

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

The Bidder proposes to provide the above named **HOLDER-WRIGHT PARK DEVELOPMENT** in accordance with the contract documents for the following sum:

Total Base Bid (in figures): \$ \_\_\_\_\_

Total Base Bid (in words): \$ \_\_\_\_\_

Unless otherwise specified in the Bid Document the amount of the total bid is based on the unit prices or lump sum set forth in the Bid Schedule attached hereto and incorporated herein.

The Bidder understands and agrees that delivery under the Agreement for **HOLDER-WRIGHT PARK DEVELOPMENT** shall be complete **two hundred and forty (240) consecutive calendar days**, or as specified in bid documents unless an extension of time is granted by the **Director of Parks & Recreation**.

Upon failure to have all work completed within the project time, the City of Dublin, Ohio shall be entitled to retain or recover from the Bidder, as liquidated damages, and not as a penalty, the amounts set forth in the following table for each and every calendar day until completion. The right of the City of Dublin, Ohio to recover liquidated damages shall not substitute for any recovery for additional costs in the event the Bidder fails to complete the Agreement for construction according to the contract documents.

Liquidated Damages:

<u>Contract Amount</u>	<u>Dollars Per Day</u>
\$0-25,000	\$ 100.00
25,001-50,000	150.00
50,001-100,000	200.00
100,001-500,000	300.00
500,001-1,000,000	500.00
1,000,001-2,000,000	750.00
2,000,001-5,000,000	1,000.00
5,000,001-10,000,000	1,500.00
Over \$10,000,001	2,000.00

**REPRESENTATIONS OF THE BIDDER**

The Bidder represents the following:

1. The Bidder has read and understands the contract documents and understands that it must comply with all requirements of the contract documents, regardless of whether the Bidder has actual knowledge of the requirements and regardless of any statement or omission made by the Bidder which might indicate a contrary intention.
2. The Proposal is based upon the items specified by the contract documents.
3. The Bidder has visited the site, become familiar with local conditions, and has correlated personal observations about the requirements of the contract documents. The Bidder has no outstanding questions regarding the interpretation of the contract documents.
4. The Bidder has submitted the following in connection with this Proposal and the information contained therein is complete and accurate:
  - a. Non-collusion Affidavit.
  - b. Bid Guaranty.
  - c. List of Subcontractors.
  - d. Delinquent Personal Property Tax Affidavit.
  - e. Affidavit of Authority (if Bidder is a corporation).
  - g. Experience Record/References.
  - h. Power of Attorney (if Bidder is an out-of-state corporation).
5. The Bidder understands that the Agreement for **HOLDER-WRIGHT PARK DEVELOPMENT** is subject to all of the provisions, duties, obligations, remedies and penalties of Ohio Revised Code Chapter.
6. Within ten (10) business days from the date of receipt the Notice of Intent to Award, the Bidder understands that it must enter into and execute an Agreement for **HOLDER-**

**WRIGHT PARK DEVELOPMENT** with the City of Dublin, Ohio if awarded on the basis of this Proposal. If the Bidder does not execute an Agreement for **HOLDER-WRIGHT PARK DEVELOPMENT** for any reason, the Bidder and the Bidder's surety shall be liable to the City of Dublin, Ohio as provided in Ohio Revised Code Section 153.54(G).

7. Within ten (10) business days of the date of receipt of the Notice of Intent to Award, the Bidder understands that it must submit the following:
  - a. Performance Bond.
  - b. Certificate of Insurance and a copy of Additional Insured Endorsement.
8. The Bidder understands that it must furnish any other information requested by the **Matt Earman, Director of Parks & Recreation**.

The Bidder hereby signs this Proposal on the \_\_\_ day of \_\_\_\_\_, **2016**.

**If Bidder is an individual, complete the following:**

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Name of Business: \_\_\_\_\_  
(if different than above)

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

**If Bidder is a partnership, complete the following:**

Name of Partnership: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

Names and Addresses of all general partners:

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**If Bidder is a joint venture, complete the following:**

Name of Joint Venture: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

Complete the following for each firm represented by the joint venture:

1. Name: \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

2. Name: \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

**If Bidder is a corporation, complete the following:**

Name of Corporation: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

Names and addresses of Corporate Officers:

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

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**If Bidder is an entity other than those described above, complete the following:**

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

Fax: ( ) \_\_\_\_\_

Type of Business Entity: \_\_\_\_\_

Names and addresses of all Principals:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## BID BOND

### HOLDER-WRIGHT PARK DEVELOPMENT

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

\_\_\_\_\_ (the  
"Principal") and \_\_\_\_\_ (the  
"Surety") are hereby held and firmly bound unto the City of Dublin, Ohio ("Dublin") as obligee in  
the penal sum of the dollar amount of the bid submitted by the Principal to Dublin on  
\_\_\_\_\_, **2016** to undertake the project known as:

### HOLDER-WRIGHT PARK DEVELOPMENT

The penal sum referred to herein shall be the dollar amount of the Principal's bid to Dublin, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to Dublin, which are accepted by Dublin. In no case shall the penal sum exceed the amount of \_\_\_\_\_ dollars (\$\_\_\_\_\_). (If the foregoing blank is not filled in, the penal sum will be the full amount of the Principal's bid, including alternates. Alternatively, if the blank is filled in, the amount stated must not be less than the full amount of the bid including alternates, in dollars and cents. A percentage is not acceptable.)

For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above-named Principal has submitted a bid for **HOLDER-WRIGHT PARK DEVELOPMENT**.

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

NOW ALSO, if the Principal shall well and faithfully do and perform the things agreed by Principal to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, material men, and laborers, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we

agreeing and assenting that this undertaking shall be for the benefit of any material man or laborer having a just claim, as well as for Dublin herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of said contract or in or to the plans or specifications therefore shall in any wise affect the obligations of the Surety on the Surety's bond, and the Surety does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the plans or specifications.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, **2016**.

**PRINCIPAL:**

\_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address:

\_\_\_\_\_

\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**SURETY:**

\_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address:  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**SURETY AGENT:**

\_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address:  
\_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**DELINQUENT PERSONAL PROPERTY TAX AFFIDAVIT**

**HOLDER-WRIGHT PARK DEVELOPMENT**

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_, SS:

I, \_\_\_\_\_ (Affiant),  
\_\_\_\_\_ (Title) of \_\_\_\_\_ (the "Bidder"),  
after being cautioned and sworn, represent to the City of Dublin, Ohio, the following: (check the  
appropriate statement)

At the time the Proposal was submitted, the Bidder was not charged with delinquent personal property taxes on the General Tax Lists of Personal Property of a county in which the City of Dublin, Ohio has territory (Franklin, Delaware, and Union Counties).

**OR**

At the time the Proposal was submitted, the Bidder was charged with delinquent personal property taxes on the General Tax Lists of Personal Property of a county in which the City of Dublin, Ohio has territory (Franklin, Delaware, and Union Counties) and that the amounts of such due and unpaid delinquent taxes, including due and unpaid penalties and interest, are set forth below:

<u>Taxes:</u>	<u>Penalties and Interest:</u>	<u>Counties:</u>
\$ _____	\$ _____	_____
\$ _____	\$ _____	_____
\$ _____	\$ _____	_____

\_\_\_\_\_  
(Signature of Affiant)

\_\_\_\_\_  
(Print Name)

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_ **2016.**

\_\_\_\_\_  
Notary Public

**NONCOLLUSION AFFIDAVIT**

**HOLDER-WRIGHT PARK DEVELOPMENT**

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_, SS:

I, \_\_\_\_\_ (Affiant),  
\_\_\_\_\_ (Title) of \_\_\_\_\_ (the  
"Bidder"), after being cautioned and sworn, represent to the City of Dublin, Ohio the following:

1. The bid price contained in the Bidder's Proposal for the Project has been arrived at independently without collusion, consultation, communication, or agreement for the purpose of restricting competition as to any matter relating to such bid price with any other bidder or third party.
2. Unless otherwise required by law, neither the bid price nor the Proposal has been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to the bid opening, directly or indirectly, to any other bidder or to any third party that would have any interest in the bid price.
3. No attempt has been made or will be made by the Bidder to induce any other individual, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.

\_\_\_\_\_  
(Signature of Affiant)

\_\_\_\_\_  
(Print Name)

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, 2016

\_\_\_\_\_  
Notary Public

**AFFIDAVIT OF AUTHORITY**

**HOLDER-WRIGHT PARK DEVELOPMENT**

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_, SS:

I, \_\_\_\_\_ (Affiant), after being cautioned and sworn, state the following:

1. I am the Secretary of \_\_\_\_\_ (the "Company"), a corporation organized and existing under the laws of the State of \_\_\_\_\_.
2. I am familiar with the records of the Company.
3. \_\_\_\_\_ (name of officer) is authorized to sign the Proposal and to execute a contract on behalf of the Company for the above-referenced project.

\_\_\_\_\_  
(Signature of Affiant)

\_\_\_\_\_  
(Print Name)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, **2016**

\_\_\_\_\_  
Notary Public

**LIST OF SUBCONTRACTORS**  
**Not Applicable \_\_\_\_\_**  
**HOLDER-WRIGHT PARK DEVELOPMENT**

NOTE: The bidder must perform at least 50% of the total contract cost with its own forces. Complete the following information for all subcontractors, which will be employed on the Project.

**1. Name of Subcontractor:** \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
Type of Work  
Subcontractor to Provide: \_\_\_\_\_

Approximate Percentage of the Contract  
Cost to be Performed by Subcontractor: \_\_\_\_\_

Experience Record: \_\_\_\_\_

**2. Name of Subcontractor:** \_\_\_\_\_

Federal Identification Number: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
Type of Work  
Subcontractor to Provide: \_\_\_\_\_

Approximate Percentage of the Contract  
Cost to be performed by Subcontractor: \_\_\_\_\_

Experience Record: \_\_\_\_\_

**3. Name of Subcontractor:** \_\_\_\_\_  
Federal Identification Number: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Type of Work  
Subcontractor to Provide: \_\_\_\_\_  
Approximate Percentage of the Contract  
Cost to be performed by Subcontractor: \_\_\_\_\_  
Experience Record: \_\_\_\_\_

**4. Name of Subcontractor:** \_\_\_\_\_  
Federal Identification Number: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Type of Work  
Subcontractor to Provide: \_\_\_\_\_  
Approximate Percentage of the Contract  
Cost to be performed by Subcontractor: \_\_\_\_\_  
Experience Record: \_\_\_\_\_

**5. Name of Subcontractor:** \_\_\_\_\_  
Federal Identification Number: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_  
Type of Work  
Subcontractor to Provide: \_\_\_\_\_  
Approximate Percentage of the Contract  
Cost to be performed by Subcontractor: \_\_\_\_\_  
Experience Record: \_\_\_\_\_

## EXPERIENCE RECORD/REFERENCES

### HOLDER-WRIGHT PARK DEVELOPMENT

NOTE: Bids from contractors inexperienced in this particular type of work will not be considered.

Complete the following information with respect to previous purchasers.

**1. Name of Person to**

Contact for Reference: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: (    ) \_\_\_\_\_

**2. Name of Person to**

Contact for Reference: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: (    ) \_\_\_\_\_

**3. Name of Person to**

Contact for Reference: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone: (    ) \_\_\_\_\_

**SECTION 3  
CONTRACT FORMS**

**NOTICE OF INTENT TO AWARD**

**HOLDER-WRIGHT PARK DEVELOPMENT**

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

You are hereby notified that the City of Dublin, Ohio has accepted the Proposal submitted by you on \_\_\_\_\_, **2016** in response to the Invitation to Bid for the above-referenced project.

Within ten (10) business days from the date of receipt of this Notice of Award, you are required to:

1. Execute an Agreement for Construction.
2. Submit a Performance Bond.
3. Submit a Certificate of Insurance and a copy of an Additional Insured Endorsement.
4. Submit an Affirmative Action Certificate of Compliance.

If you fail to execute the Agreement for construction or provide the required submittals within ten (10) business days from the date of receipt of this Notice of Intent to Award, you or your surety shall be liable to the City of Dublin, Ohio as provided in Ohio Revised Code Section 153.54(G) and the City of Dublin, Ohio may award the contract to the next lowest and best bidder.

You are required to prepare and submit a progress schedule prior to the pre-construction conference to be held on \_\_\_\_\_ **Not Applicable** \_\_\_\_\_

Return an acknowledged copy of this Notice of Intent to Award to:  
**Matt Earman, Director of Parks & Recreation**  
**Parks & Recreation**  
**6555 Shier Rings Road**  
**Dublin, Ohio 43016**

**CITY OF DUBLIN, OHIO**

Date: \_\_\_\_\_

By: \_\_\_\_\_  
**Matt Earman**  
**Director of Parks & Recreation**

**RECEIPT OF NOTICE OF INTENT TO AWARD**

Receipt of this Notice of Intent to Award is hereby acknowledged this \_\_\_ day  
of \_\_\_\_\_, **2016**.

Company Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Contract No: \_\_\_\_\_

**STANDARD AGREEMENT  
CITY OF DUBLIN, OHIO**

This Agreement is entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the City of Dublin, Ohio (**DUBLIN**), the Owner, located at 5200 Emerald Parkway, Dublin, Ohio 43017, and the

**SERVICE PROVIDER**

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For services in connection with:

All materials and labor necessary for the construction of a parking lot, small pedestrian bridge, restroom facility, specialized form liner concrete work, sidewalks, grading and shaping earth mounds, and landscape installation for the Holder-Wright Park development.

**FOR THE FOLLOWING:**

**HOLDER-WRIGHT PARK DEVELOPMENT**

The **ARCHITECT** of the Project is

David Parkinson, P.E.  
CT Consultants, Inc.  
7965 North High Street  
Suite 340  
Columbus, OH 43235

**THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES. CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS EXECUTION, COMPLETION AND MODIFICATION.**

**CONTRACT DOCUMENTS**

This Agreement is for performance of a portion of the Work for the Project identified above. All Work by Service Provider shall be performed in accordance with the Contract Documents. The Contract Documents comprise of and include this Agreement, General and Supplemental Conditions, Plans and Specifications, Project Manuals and all amendments thereto. These Contract Documents are hereby specifically incorporated herein as part of this Agreement and shall govern the Service Provider for his portion of the Work related to the Project.

Service Provider shall furnish all materials, supplies, equipment, and other items proper or necessary to perform and complete the Work, including specifically providing all supervision and labor required for the completion of the Work in accordance with the Contract Documents.

Service Provider agrees and acknowledges that it has evaluated and is satisfied with the conditions and limitations under which the Work is to be performed, including, without limitation (i) the location, condition, layout and nature of the Project site and surrounding areas; (ii) generally prevailing weather and climatic conditions; (iii) anticipated labor supply and costs; (iv) availability and cost of materials, tools and equipment; and (v) other similar issues. Service Provider further represents and warrants that it is familiar with the entire Scope of its Work and that the Contract Price includes all of its Work that is specifically included in the Contract Documents or which is reasonably inferable from the Contract Documents.

**1.4**

In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, Service Provider shall (i) provide the better quality or greater quantity of Work or (ii) comply with the more stringent requirement.

**CONTRACT PRICE**

As full compensation for performance of the Agreement, Dublin agrees to pay Service Provider in current funds the Contract Price for the satisfactory performance of the Work, in the manner described below, subject to all applicable provisions of the Agreement (check appropriate box):

the firm fixed price of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) subject to additions and deductions as provided for in the Contract Documents; and/or

unit prices in accordance with the attached Schedule of Unit Prices and estimated quantities, which is incorporated herein by reference and identified as Schedule; and/or

- time and material rates and prices in accordance with the attached Schedule of Labor and Material Costs which is incorporated herein by reference and identified as Schedule

## 2.2

The firm fixed-price, unit prices and/or time and material rates and prices are hereinafter referred to as the "Contract Price."

### **SURETY BONDING**

#### **BONDS**

Service Provider shall, if required, furnish to Dublin appropriate surety bonds to secure performance of the Work and to satisfy all Service Provider's payment obligations under the Agreement. The surety bond shall provide that the terms of the Agreement and Contract Documents are incorporated by reference therein. Any bond provided by Service Provider pursuant to this provision is hereby deemed to so incorporate the Contract Documents and it is understood that the surety is accepting each and every responsibility and obligation which Service Provider has assumed toward Dublin under this Agreement and the Contract Documents, including but not limited to liability for indemnity, attorneys' fees and delay damages.

Bond:             Required             Not Required

If a performance or payment bond, or both, are required of the Service Provider under this Agreement, then said bonds shall be in the full amount of the Contract Price, unless otherwise specified herein.

The cost of the bond, if required, is included in the Contract Price.

In the event Service Provider shall fail to provide the required bonds within seven days after date of signature of this Agreement by both Parties, Dublin after giving the Service Provider written notice and opportunity to cure this may terminate this Agreement and enter into a contract for the balance of the Work with another contractor. The Service Provider shall pay all Dublin's costs and expenses incurred by Dublin as a result of said termination.

### **PERFORMANCE OF WORK**

#### **TIME IS OF THE ESSENCE**

It is expressly understood and agreed by and between the Parties that time is of the essence regarding completion of the Work by Service Provider. Service Provider shall undertake all activities necessary for the performance of its Work immediately upon receipt of a letter of intent or notification of the award of this Agreement and shall commence work hereunder so that the entire Project may be completed in accordance

with the Project Schedule. Service Provider shall perform, coordinate and schedule its Work so as not to cause any delay or disruption to the Project Schedule, the work of other entities on this Project or the completion date of the Project.

Service Provider acknowledges and agrees that Dublin will incur additional costs, damages, liabilities, lost profits or losses related to loss of use if this Project is not completed in accordance with any milestone or interim dates/deadlines or the substantial or final completion dates on the Project Schedule. As a result, Service Provider shall be liable for and shall reimburse Dublin for any such additional costs, damages, liabilities, lost profits or losses related to loss of use for its failure to meet all milestone, interim, substantial or final completion dates in accordance with the Project Schedule.

### **RELATIONSHIP OF THE PARTIES**

Service Provider accepts the relationship of trust and confidence established by this Agreement to exercise its skill and judgment to further Dublin's interests, and to perform the Work in an expeditious and economical manner consistent with Dublin's interests. Nothing in this Agreement shall be construed to constitute the relationship between Service Provider and Dublin as a partnership, association, or joint venture.

Service Provider shall perform its Work under the general direction of Dublin (and/or Dublin's representative, construction manager, architect, or other duly authorized individual/entity) and in accordance with this Agreement and as reasonably inferable from the Contract Documents as being necessary to produce the intended results as specified hereafter.

### **PROJECT SCHEDULE**

Service Provider agrees to perform its work in accordance with the sequence and schedule for this Project, and with any updates thereto (referred to in this Agreement as the "Project Schedule"). By agreeing to perform its Work in accordance with the Project Schedule, Service Provider has included reasonable allowances for out of sequence work, and weather and unusual or unforeseen delays. If requested by Dublin, Service Provider shall participate and cooperate in the development of the Project Schedule and any revisions thereto.

Service Provider shall continuously monitor the Project Schedule so as to be fully familiar with the timing, phasing and sequence of operations of Service Provider's Work and the other work being performed on the Project. Service Provider shall coordinate its Work with all other work on the Project to avoid conflict or interference with such other work.

If Dublin determines that Service Provider's Work has failed to meet the Project Schedule or any update thereof, Service Provider shall within seventy-two (72) hours of

its receipt of written notice from Dublin prepare and submit a recovery schedule relating to its activities. Service Provider agrees that it shall at its sole cost and expense take such measures as are necessary, including adding manpower and/or equipment and/or working overtime to accelerate its activities to conform to the Project Schedule or any update thereto. Should Service Provider fail to undertake such measures Dublin shall have the right to supplement Service Provider's forces and/or equipment and back-charge Service Provider for the costs so incurred, together with a markup of ten percent (10%) for overhead and profit.

## **PERFORMANCE**

Service Provider shall use its best care, skill, and diligence in supervising, directing and performing, the Work. Service Provider shall have sole responsibility for the performance of the Work, including the methods, techniques and means for completing all portions of the Work. Service Provider has the responsibility to ensure that all material suppliers and subcontractors adhere to the Contract Documents, and that they order materials in time, taking into account the current market regarding both pricing and delivery conditions.

## **EXTRAORDINARY MEASURES BY DUBLIN**

If the performance of the Work, as of a milestone or interim date/deadline on the Project Schedule, has not progressed or reached the level of completion required by the Contract Documents, Dublin shall have the right to order Service Provider to take corrective measures necessary to expedite the progress of the Work, including, without limitation, (i) working additional shifts or overtime, (ii) supplying additional manpower, equipment, and facilities, and (iii) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. Dublin's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Project Schedule. Service Provider shall not be entitled to an adjustment in the Contract Price in connection with Extraordinary Measures required by Dublin.

## **INTERPRETATION OF AGREEMENT**

### **INCONSISTENCIES AND OMISSIONS**

Should inconsistencies or omissions appear in the Contract Documents, it shall be the duty of Service Provider to so notify Dublin in writing within three (3) working days of Service Provider's discovery thereof. Upon receipt of said notice, Dublin shall instruct the Service Provider as to the measures to be taken and Service Provider shall comply with Dublin's instructions. If Service Provider performs work knowing it to be contrary to any applicable laws, statues, ordinances, building codes, rules or regulations without notice to Dublin and advance approval by appropriate authorities, then Service Provider

shall assume full responsibility for such work and shall bear all associated costs, charges, fees and expenses necessarily incurred to remedy the situation.

#### **LAW AND EFFECT**

The performance of this Agreement and all of its terms and conditions shall be interpreted and governed by the laws of the State of Ohio, unless otherwise noted herein.

#### **SEVERABILITY**

The partial or complete invalidity of anyone or more provisions of this Agreement shall not affect the validity or continuing force and effect of any other provision.

#### **ENTIRE AGREEMENT**

This Agreement is solely for the benefit of the signatories hereto and represents the entire and integrated agreement between the Parties hereto and, unless specifically referenced herein, supersedes any prior negotiations, representations, or agreements, either written or oral.

#### **DUBLIN'S OBLIGATIONS**

##### **FINANCING INFORMATION**

Upon written request from Service Provider, Dublin agrees to furnish reasonable evidence that financial arrangements have been made or otherwise exist to fulfill Dublin's payment obligations under the Agreement.

##### **PROJECT FEES**

Except for permits and fees, which are the responsibility of Service Provider, Dublin agrees to secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

##### **TIMELY COMMUNICATIONS**

Dublin, with reasonable promptness, shall transmit all submittals, transmittals, and written approvals relating to the Work. Any other information or services relevant to service Provider's performance of the Work under Dublin's control shall be furnished by Dublin after receipt from Service Provider of a written request for such information or services.

#### **SERVICE PROVIDER'S OBLIGATIONS**

## **RESPONSIBILITIES**

Service Provider shall furnish all of the labor, materials, equipment, and services, including, but not limited to, competent supervision, shop drawings, samples, tools, and equipment as may be necessary for the proper performance of the Work in accordance with and as reasonably inferable from the Contract Documents.

## **SUBCONTRACTING**

Service Provider shall provide to Dublin written notice that it intends to subcontract any of the Work covered by the scope of the Contract Documents to a third party. Dublin shall have the right to approve any and all such subcontracts and Service Provider shall not allow any work to be performed by any subcontractor that has not been approved in writing by Dublin. Service Provider agrees that it shall not be entitled to any additional compensation in the event that Dublin does not approve a proposed subcontractor. Service Provider further agrees to incorporate the terms and conditions of this Agreement into every subcontract.

In the event that Service Provider has work performed by a subcontractor who has not been approved by Dublin, Dublin shall have the right to terminate this Agreement or supplement Service Provider's Work as necessary to have the same completed in accordance with the Contract Documents. Any and all costs incurred by Dublin as a result of such action shall be the responsibility of Service Provider and Dublin may back-charge Service Provider therefor.

## **SHOP DRAWINGS SAMPLES, PRODUCT DATA AND MANUFACTURERS' LITERATURE**

To the extent applicable or required, Service Provider shall promptly submit to Dublin for approval all shop drawings, samples, product data, manufacturers' literature and similar submittals as required by the Contract Documents or as required herein. Service Provider shall prepare and deliver its submittals to Dublin in such time and sequence so as not to delay the Project. The approval of any Service Provider submittal shall not be deemed to authorize deviations, substitutions or changes in the requirements of the Contract Documents unless express written approval is obtained from Dublin authorizing such deviation, substitution or change.

## **COORDINATION AND COOPERATION**

Service Provider shall:

- (a) cooperate with Dublin and all others whose work may interfere or interface with the Work;
- (b) before proceeding with the Work under this Agreement, accurately check all previous and surrounding work done by other entities, determine its correctness, specifically note and immediately advise Dublin of any interference

or discrepancies with the Work. Failure of Service Provider to detect and report discrepancies shall relieve Dublin of any and all Service Provider claims to recover cost, expense or damage resulting there from; and

- (c) participate in the preparation of coordination drawings and work schedules involving the Work, to the extent required or requested by Dublin.

#### **AUTHORIZED REPRESENTATIVE**

Unless otherwise stated in writing by Dublin, Service Provider shall have a competent foreman, superintendent, or representative, satisfactory to Dublin, on the Project at all times with authority to act on behalf of Service Provider with respect to the work and for the purpose of receiving notices, orders and instructions. Service Provider shall identify the person or persons so authorized to act on its behalf, in writing, before commencing work on the Project. All decisions, agreements or representations made by Service Provider's designated representative for this Project, whether oral or written, shall be binding on Service Provider.

#### **TESTS AND INSPECTIONS**

Service Provider shall schedule all required tests, approvals and inspections of the Work or portions thereof at appropriate times so as not to delay the progress of the Work or the Project. Service Provider shall bear all expenses associated with tests, inspections and approvals required of the Service Provider by the Contract Documents, unless otherwise agreed to.

#### **WORKMANSHIP**

Every part of the Work shall be executed in accordance with the Contract Documents in a workmanlike and professional manner. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work, and shall be new.

#### **MATERIALS FURNISHED BY OTHERS**

In the event the scope of the Work includes installation of materials or equipment furnished by others, it shall be the responsibility of Service Provider to examine those items, store and install the items, unless otherwise provided for in the Contract Documents, with such skill and care as to ensure a satisfactory and proper installation. Loss or damage due to acts of Service Provider shall be deducted from any amounts due or to become due Service Provider under this Agreement.

#### **SUBSTITUTIONS**

No substitutions shall be made in the Work unless permitted in the Contract Documents and then only upon the Service Provider first receiving all approvals required under the Contract Documents for substitutions.

### **WARRANTY**

Service Provider warrants and guarantees that its Work conforms in all respects to the Contract Documents and that it is free from defects in material and/or workmanship. Service Provider hereby warrants and guarantees its work to be free of defects in material or workmanship for a period of one year from the date of substantial completion, or such longer period as may be required by the Contract Documents or provided by any manufacturer's warranty applicable thereto. Service Provider further agrees to furnish any special warranties required by the Contract Documents relating to its Work prior to and as a condition of final payment. Service Provider agrees to perform any remedial or corrective work necessary to satisfy its warranty obligations without cost to Dublin.

### **UNCOVERING/CORRECTION OF WORK**

If directed in writing by Dublin, Service Provider must uncover any portion of the Work, which has been covered by the Service Provider in violation of the Contract Documents or contrary to a directive issued by Dublin. Upon receipt of a written directive from Dublin, Service Provider shall uncover such Work for Dublin's inspection and then

restore the uncovered Work to its original condition at the Service Provider's time and expense.

Dublin may direct Service Provider to uncover portions of the Work for inspection by Dublin at any time. Service Provider is required to uncover such Work whether or not Dublin had requested to inspect the Work prior to it being covered. This Agreement shall be adjusted by Change Order for the cost and time of uncovering and restoring any Work which is uncovered for inspection and proves to be installed in accordance with the Contract Documents, provided Dublin had not previously instructed the Service Provider to leave the Work uncovered. If Service Provider uncovers Work pursuant to a directive issued by Dublin, and such Work upon inspection does not comply with the Contract Documents, then Service Provider shall be responsible for all costs and time of uncovering, correcting and restoring the Work so as to make it conform to the Contract Documents.

Service Provider is required to correct in a timely fashion any Work rejected by Dublin for failing to comply with the Contract Documents whether observed prior to the commencement of the warranty period(s) or during the warranty period(s). Service Provider shall correct at its own cost and time and bear the

expense of additional services for any nonconforming Work for which it is responsible.

## **CLEANUP**

Service Provider shall at all times: (a) keep the Project and premises free from all rubbish and debris resulting from the Work; (b) broom clean each of its work areas prior to discontinuing work each day; and (c) clean up to the satisfaction of Dublin, including, but not limited to, dirt, grease, machine marks, etc., from walks, ceilings, floors, fixtures, etc. deposited or placed by or resulting from its Work.

If Service Provider fails to immediately commence compliance with cleanup duties within twenty-four (24) hours after written notification from Dublin of non-compliance, Dublin may implement appropriate cleanup measures without further notice and deduct the cost thereof from any amounts due or to become due to Service Provider under this Agreement.

## **SAFETY OF PERSONS AND PROPERTY**

Service Provider is responsible for the health and safety of its employees, agents, subcontractors, and other persons on and adjacent to the Project site. Service Provider, however, shall take all necessary and prudent safety precautions with respect to its Work and shall comply with all safety programs and measures, and with all applicable laws, ordinances, rules, regulations and orders of any public authority for the safety of persons or property, including, but not limited to, OSHA. Service Provider shall also coordinate work activities with Dublin, other contractors or entities, or any other parties involved with this Project to reduce the risk of an accident or injury occurring.

Service Provider shall protect any of its Work and materials susceptible to damage from moisture or hosting of mold at all times. Service Provider agrees to indemnify, hold harmless and defend 3-12

Dublin from any and all claims, losses, costs and expenses (including, but not limited to, all attorneys' and consultants' fees) relating to or arising from mold resulting from Service Provider's Work.

## **INSURANCE**

### **SERVICE PROVIDER'S INSURANCE**

Prior to start of the Work, Service Provider shall procure and maintain in full force and effect Workers' Compensation Insurance, Employer's Liability Insurance, Comprehensive or Commercial General Liability Insurance on an occurrence basis, and any additional insurance required of Service Provider. Service Provider shall deliver all certificates of insurance to Dublin, or upon request, copies of the actual insurance policies. All liability insurance policies described above shall be written on a comprehensive form and shall conform to the laws of the State of Ohio. Before any of the Service Provider's

employees perform any work on the Project, Service Provider shall furnish Dublin with the Insurance Company's certificate that such coverage has been provided and each certificate shall contain the required limits. Dublin shall be specifically named and included as an additional insured party under all coverage required by this Agreement and coverage for such additional insured shall also be amended to include a waiver of subrogation and primary and noncontributing endorsements in favor of the additional insured.

The types of insurance, and minimum amount of limits, required hereunder are:

- (A) Workers' Compensation Insurance coverage: statutory requirements in the State of Ohio.
- (B) Employers Liability Insurance with limits of not less than \$1,000,000 to anyone person: USL&H; FEOLA; Jones Act; and, Continental Shelf Act Endorsements, if applicable.
- (C) Commercial General Liability Insurance, written on an occurrence form:
  - Standard Limits
  - Excess Liability Policy, if applicable: \$\_\_\_\_,000,000.
  - Professional Liability, if applicable, \$1,000,000 Each Occurrence, with not less than a Five Year Completed Operations period if claims-made coverage.
  - Other policies.

#### **NUMBER OF POLICIES**

Commercial General Liability insurance and other liability insurance may be arranged under a single policy for the full limits required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability Policy. The Umbrella Liability coverage must be as broad or broader than the Primary Insurance Policies.

#### **PROPERTY INSURANCE**

Service Provider is responsible to provide insurance coverage for tools, equipment or personal belongings that are owned or leased by the Service Provider or its employees at Service Provider's own expense. Service Provider accepts and shall bear the risk of loss for its property, material, or equipment, which is stored on-site and off-site.

#### **SUBROGATION**

Service Provider on behalf of itself, its insurers, successors and assigns does hereby waive any and all rights of subrogation against Dublin relating to or arising from any loss

or damage which is within any insurance coverage of Service Provider, regardless of whether a claim has been submitted to or denied by the insurer.

#### **INDEMNIFICATION AND DUTY TO DEFEND**

Except to the extent expressly prohibited by statute, Service Provider agrees to fully indemnify and hold harmless Dublin and its elected officials, agents, officers, representatives, attorneys, employees, volunteers, indemnities, independent contractors and invitees from and against any and all claims, causes of action, amounts, damages, demands, expenses, judgments, liabilities, losses, obligations, proceedings and costs, including actual attorneys' fees, expert witness fees and costs incurred, that in whole or in part, arise out of, involve, result from, relate to or are alleged to have been caused by:

(a) The performance of any aspect of the Work by Service Provider or any of its subcontractors, independent contractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or their respective agents and/or employees;

(b) Act(s), failure(s) to act, omission(s) or negligence of or by Service Provider or any of its subcontractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or any of their respective agents and/or employees.

(c) Injury or death to persons or damage to property which arises out of, involves, results from, relates to or is caused by, in whole or in part, any action(s), inaction(s) and/or negligence of or by Service Provider or any of its subcontractors, independent contractors, suppliers, manufacturers, materialmen or persons or entities for whose acts Service Provider is or may be liable and/or any of their respective agents and/or employees.

(d) The failure of Service Provider to pay its subcontractors, suppliers, materialmen, laborers, union fringe benefits or any other obligation arising in the performance of the Work.

This indemnification provision shall not be construed to negate, abridge or reduce any other rights of Dublin and its elected officials, agents, officers, representatives, attorneys, employees, volunteers, indemnities, independent contractors and invitees.

In the event that any such claims, loss, cost, expense, liability, damage or other injury arise or are made or threatened against any indemnity hereunder, Dublin shall have the right to withhold any payments due or to become due to Service Provider an amount sufficient in its judgment and sole discretion to protect and indemnify in accordance with this provision against any and all such claims, loss, damage, cost and expense.

All indemnity obligations set forth in this Agreement shall survive the termination of this Agreement or the completion of Service Provider's Work.

## **CHANGES, CLAIMS AND DELAYS**

### **CHANGES**

#### **Change to Agreement**

Without invalidating this Agreement, Dublin may change, add to or reduce the Work to be performed hereunder. Any such change may be authorized as set forth herein.

#### **Change Order**

A Change Order is a document prepared by Dublin and signed by Service Provider stating their agreement upon the change in the scope of the Work, adjustment in the Contract Price and/or to the Project Schedule.

#### **Adjustment in Contract Price**

Service Provider shall not be entitled to receive compensation for extra work, materials or changes of any kind regardless of whether ordered by Dublin or Dublin's Representative, unless a written Change Order has been previously issued and signed by Dublin. If a change was ordered by Dublin or Dublin's Representative, and Service Provider performed but did not receive a written Change Order, Service Provider shall be deemed to have waived any claim for extra compensation, including anything related to schedule impacts or lost productivity, regardless of any written or verbal protests or claims by Service Provider. Dublin's issuance of a signed, written Change Order shall be deemed and construed as a condition precedent to Service Provider's filing of a valid claim for extra compensation as a result of Service Provider's performance of any work not originally included as part of the original scope of Work. If a Change Order requires an adjustment in the Contract Price, the adjustment shall be established by one of the following methods:

- (a) mutual agreement on a lump sum, which shall be supported by sufficient information submitted by Service Provider to substantiate the amount, including specifically a labor, material, equipment and Service Provider's cost breakdown;
- (b) unit prices already established in the Agreement or if not established by the Agreement then established by mutual agreement for the adjustment;
- (c) on a time and material basis or, if none, then as otherwise allowed by the Contract Documents, or, if none, as jointly acceptable.
- (d) for overtime work, Service Provider shall only be entitled to recover the premium time differential without mark-up of any kind.

Agreement on any Change Order shall constitute a final settlement, and full accord and satisfaction, of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, the cumulative effect on the Project of all change orders issued to the date thereof, all direct and indirect costs, home office overhead and any and all adjustments to the Contract Price or Project Schedule.

## **CLAIMS**

### **Claim**

A claim is a demand or assertion made in writing by Dublin or Service Provider seeking an adjustment to the Contract Price and/or Project Schedule, an adjustment or interpretation of the Agreement's terms, or other relief arising under or relating to this Agreement, including the resolution of any matters in dispute between Dublin and Service Provider in connection with the Project.

### **Timing of Claims**

Claims by Service Provider must be made within 21 days after occurrence of the event giving rise to such Claim. Claims must be initiated by written notice to Dublin and must be submitted through the "Statement of Claim" Form attached As Exhibit A to this Agreement. Any submitted "Statement of Claim" Forms must be complete, accurate and contain all information requested by the "Statement of Claim" Form. Failure by Service Provider to present written claims within 21 days of the event giving rise to the claim through the "Statement of Claim" shall constitute an express waiver of any rights to additional time, money or other relief.

### **Claim Documentation**

All Claims presented or submitted by Service Provider shall include all supporting documentation and information to allow Dublin to evaluate the Claim. Dublin may request any additional documentation or information from Service Provider (whether maintained in any form or medium) to assist in assessing and evaluating Service Provider's Claim, and Service Provider agrees to provide the same.

Within ten (10) days of its receipt of a written request, Service Provider shall make available to Dublin or Dublin's Representative any books, records or other documents or information in its possession, custody or control relating to any Claim. Service Provider shall also require its subcontractors and suppliers, regardless of tier, to do likewise.

## **DELAYS/TIME IMPACT**

Should Service Provider delay the progress of the Work so as to cause Dublin to suffer or become liable for any damages, Service Provider agrees to pay to Dublin the full amount of any and all such damages. Such damages, at Dublin's option, may be deducted from any payments due, or which become due, under

the Agreement. Nothing in this paragraph shall limit Dublin's right to claim all actual damages sustained by it as a result

of Service Provider's delay. In addition, Dublin may terminate this Agreement for default as provided in Article 13 herein.

Dublin shall have the right, at any time, to delay or suspend the start or prosecution of the whole or any part of the Work under this Agreement, or to vary the sequence of performance thereof. Progress schedules may from time to time be modified to conform to contract completion requirements.

Dublin shall not be liable to Service Provider for delay to Service Provider's Work by reason of fire or other casualty; or on account of riots or of strikes, or other combined action of the workmen or other persons; or on account of any acts of God; or any other cause, whether foreseen or unforeseen, beyond Dublin's control.

All schedules incorporated into the Contract Documents or provided during the course of the performance of the Work are provided for the Service Provider's convenience. Dublin does not warrant or guarantee such Schedule(s) and Service Provider should not rely upon the sequence or duration of activities as set forth therein for any purpose, including the pricing of the Work. Service Provider specifically acknowledges that the sequence and duration of activities set forth in the Schedule(s) typically change on projects of this size, nature and complexity, and that they are likely to change on this Project. Dublin shall have the right to determine and, if necessary, change the time, order and priority in which the various portions of the Work is to be performed and all other matters relative to the timely and orderly conduct of the Work.

## **PAYMENT**

### **GENERAL PROVISIONS**

#### **Schedule of Values**

If the Agreement is not a unit price agreement, then the Service Provider shall prepare and submit to the Contractor prior to the due date for the submission of Service Provider's first application for payment, a Schedule of Values apportioned to the various divisions or phases of the Work. The Schedule of Values shall include line items for each portion of the Work. Each line item contained in the Schedule of Values shall be assigned an appropriate monetary price such that the total of all such items shall equal the Contract Price. The Schedule of Values shall be prepared in such detail as may be required by Dublin.

**Payment Use and Verification**

Service Provider is required to pay for all labor, materials, and equipment used in the performance of the Work. Reasonable evidence, satisfactory to Dublin, may be required to show that all obligations relating to Subcontract Work are current before releasing any payment due to Service Provider. If required by Dublin, before final payment is made for the Work, Service Provider shall submit evidence satisfactory to Dublin that all payrolls, bills for materials and equipment, and all known indebtedness connected with the Agreement and the Work, have been paid or otherwise satisfied.

**Taxes**

Service Provider agrees to withhold all municipal income taxes due or payable under the provisions of Chapter 181 of the Codified Ordinances of Dublin, Ohio, for wages, salaries and commissions paid to its employees and further agrees to require that all of its subcontractors shall also withhold any such municipal income taxes due under such chapter for any work completed or services performed related to this Project.

**Payment Not Acceptance**

Payment to Service Provider by Dublin does not constitute or imply acceptance of any portion of the Work.

**PROGRESS PAYMENTS****Applications**

Service Provider's Applications for Payment shall, unless otherwise required by Dublin or the Contract Documents, be submitted on the AIA 0702 form and shall be itemized and supported by the Service Provider's Schedule of Values, unit prices, and any other substantiating data as required by Dublin.

**Partial Lien Waivers and Affidavits**

Service Provider shall obtain from all of its subcontractors, vendors and suppliers, regardless of tier, a waiver of claim under the relevant mechanic's lien laws for the Project of all claim or lien rights for the amounts for which they have received payments with respect to the Project in the form attached hereto as Exhibit B to the Agreement.

**Rejection of Service Provider's Payment Application**

Dublin may reject a Service Provider's payment application or nullify a previously approved payment application, in whole or in part, as may reasonably be necessary to protect Dublin from loss or damage based upon:

- (a) Service Provider's repeated failure to perform the Work as required by the Contract Documents;

- (b) loss or damage arising out of or relating to the Contract Documents and caused by Service Provider to Dublin;
- (c) Service Provider's failure to properly pay for labor, materials, equipment or supplies furnished in connection with the Work;
- (d) rejected, nonconforming or defective Work, which has not been corrected in a timely fashion;
- (e) reasonable evidence of delay in performance of the Work such that the Work will not be completed in accordance with the Project Schedule, and that the unpaid balance of the Contract Price is not sufficient to offset the additional costs or damages that may be incurred by Dublin as a result of the anticipated delay caused by Service Provider;
- (f) reasonable evidence demonstrating that the unpaid balance of the Contract Price is insufficient to cover the cost to complete the Work; or
- (g) third party claims involving Service Provider or reasonable evidence demonstrating that third party claims are likely to be filed unless and until Service Provider furnishes Dublin with adequate security in the form of a surety bond, letter of credit or other collateral or commitment which are sufficient to discharge such claims if established.

**Payment Amount**

Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

1. The portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Price allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10%). Pending final determination of cost to Dublin of changes in the Work, amounts not in dispute shall be included and paid upon approval and payment by Dublin.
2. The progress payment amount shall be further modified under the following circumstance: (a) Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Price, less such amounts as Dublin shall determine for incomplete Work, retainage applicable to such Work and unsettled claims.
3. Dublin shall not make advance payments to Service Provider for materials or equipment, which have not been delivered and stored at the site unless the Contract Documents allow otherwise.

**Time of Application**

For each progress payment period, Service Provider shall submit its progress payment application to Dublin for the Work performed to date no later than the fifth day of each month, unless otherwise agreed.

**Stored Materials and Equipment**

To the extent permitted by the Contract Documents, applications for payment may include materials and equipment not incorporated into the Work. Approval of payment applications for materials and equipment stored on or off the site shall be conditioned on submission by Service Provider of bills of sale and applicable insurance or such other procedures satisfactory to Dublin to establish the proper valuation of the stored materials and equipment.

**Time of Payment**

Dublin shall make progress payments for all undisputed amounts to Service Provider for satisfactory performance of the Work no later than thirty (30) calendar days after receipt of Service Provider's complete payment application.

**FINAL PAYMENT****Application**

Service Provider may submit its final payment application to Dublin upon acceptance of the Work by Dublin, and upon Service Provider furnishing evidence of fulfillment of the Service Provider's obligations in accordance with the Agreement.

**Requirements**

When submitting its final payment application, Service Provider shall furnish the following to Dublin:

- (a) the Final Waiver of Lien form attached hereto as Exhibit C. Such form shall be in the amount of the application for final payment and be accompanied by the same Final Lien Waiver form executed by Service Provider's subcontractors, materialmen and suppliers;
- (b) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Dublin might in any way be liable, have been paid or otherwise satisfied;
- (c) consent of Service Provider's surety to final payment, if applicable and required;
- (d) satisfaction of closeout procedures required by Dublin;
- (e) current certificates of insurance establishing that all insurance coverage required by the Agreement shall remain in effect through the final

acceptance of the Project by Dublin, or such later date as may be required by the Contract Documents, and that such coverage will not be materially altered, expire or terminate without thirty (30) days prior certified mail notice thereof; and

- (f) other data if required by Dublin, such as receipts, releases, and waivers of liens effective upon payment. Acceptance of final payment by Service Provider shall constitute a waiver of any and all claims (whether known or unknown) by Service Provider except those previously made in writing and identified by Service Provider as unsettled at the time of final application for payment.

#### **Time of Payment**

Final payment of the undisputed balance due of the Contract Price shall be made to Service Provider within thirty (30) calendar days after receipt of all information required under Section 12.3 of this Agreement.

## **DISPUTE RESOLUTION**

### **INITIAL DISPUTE RESOLUTION**

If a dispute arises out of, or relates to this Subcontract or the alleged breach thereof, the parties shall endeavor to settle the dispute first through direct discussions by and between the parties respective Project Managers or principals.

If the dispute cannot be settled through direct discussions, the parties shall then endeavor to settle the dispute by mediation in accordance with the Construction Industry Mediation Rules of the American Arbitration Association. Notice of demand for mediation shall be filed in writing with the other party to this Agreement with the American Arbitration Association. The demand for mediation shall be made within a reasonable time after written notice of the claim, dispute or other matter in question has been given, but in no event shall it be made when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statutes of limitation. The location of the proceedings shall be in Dublin, Ohio, unless the parties agree otherwise. The parties shall share all costs of the mediation equally.

### **ARBITRATION/LITIGATION**

In the event that a dispute is not resolved as set forth above, Dublin shall have the right, in its sole and exclusive discretion, to elect whether the dispute will then be decided by arbitration or litigation. In the event that Dublin should elect to resolve the dispute through Arbitration it shall so notify Service Provider in writing. The parties will then meet or confer to reach agreement on an arbitrator. The arbitration shall be conducted in general conformity with the Construction Industry Rules of the American Arbitration Association, however, the American Arbitration Association shall not administer the arbitration. The locale of any arbitration hearing shall be Dublin, Ohio. Any award rendered in the arbitration shall be final and binding upon the parties and may be enforced in any court of competent jurisdiction.

In the event that Contractor should elect to resolve the dispute through litigation jurisdiction thereof shall reside exclusively with the Common Pleas court of Franklin County, Ohio.

#### **PREVAILING PARTY**

In the event of any arbitration, the prevailing party shall be awarded its share of the arbitration costs and arbitrator compensation. For the purpose of the application of this provision, the arbitrator(s) shall determine the prevailing party as follows: the prevailing party shall be that party who's last written settlement position (demand/offer) made before the commencement of the arbitration hearing(s) is closest to the final award rendered by the arbitrator(s). In order to be considered for the purpose of this provision, any settlement position (demand/offer) must be in writing and must have been delivered by certified mail to the other party. It is the intent of this provision for the arbitrator(s) to identify the true party prevailing in any arbitration proceeding. To that end, in the event that a party seeking relief has not taken a settlement position, i.e. the claimant, the

arbitrator(s) shall consider the settlement demand to be the full relief requested in the arbitration demand. In the event that the respondent has not taken a settlement position,

the arbitrator(s) shall consider the offer to be a complete rejection of the relief requested by the claimant. Where there are mixed claims and counterclaims, the determination of the prevailing party shall be within the discretion of the arbitrator(s) consistent with the intent of this provision."

#### **WORK CONTINUATION AND PAYMENT**

Service Provider shall carry on the Work and maintain the Project Schedule pending final resolution of a Claim including mediation, arbitration or litigation, unless the Agreement has been terminated or the Work suspended as provided for in the Agreement, or the parties otherwise agree in writing to a partial or

total suspension of the Work. If Service Provider is continuing to perform in accordance with the Agreement, Dublin shall continue to make undisputed payments as required by the Agreement.

**RECOURSE BY DUBLIN  
FAILURE OF PERFORMANCE**

**Notice to Cure**

If Service Provider refuses or fails to supply enough properly skilled workers, proper materials, or maintain the Project Schedule, or it fails to make prompt payment to its workers, subcontractors or suppliers, disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a breach of a provision of this Agreement, Service Provider may be deemed in default of this Agreement. If Service Provider fails within three (3) working days after written notification to commence and continue satisfactory correction of such default, with diligence and promptness, then Dublin without prejudice to any other rights or remedies, shall have the right to any or all of the following remedies:

- (a) supply such number of workers and quantity of materials, equipment and other facilities as Dublin deems necessary for the satisfactory correction of such default, which Service Provider has failed to complete or perform after the aforesaid notice, and charge the cost thereof to Service Provider, who shall be liable for the payment of same including reasonable overhead and profit;
- (b) contract with one or more additional contractors, to perform such part of the Work, as Dublin shall determine will provide the most expeditious correction of the default and charge the cost thereof to Service Provider;
- (c) without further notice to Service Provider, withhold payment of monies due the Service Provider in accordance with this Agreement; and
- (d) in the event of an emergency affecting the safety of persons or property (as determined in Dublin's sole discretion), Dublin may correct such default, without first giving three (3) working days' written notice to Service Provider, but shall

give prompt written notice of such action to Service Provider, and charge the cost thereof to the Service Provider.

Service Provider agrees to indemnify and hold Dublin harmless from and against any and all damage, loss, cost or expense, including the actual attorneys' fees incurred, arising from or relating to the default of Service Provider, regardless of whether Service Provider cures the default or is ultimately determined not to have been in default of its obligations under this Agreement, in which event the

termination shall be deemed to have been a termination for Dublin's convenience.

### **Termination by Dublin**

#### Termination for Default/Cause

If Service Provider fails to commence and satisfactorily continue correction of a default within three (3) working days after written notification from Dublin, then the Agreement may be terminated and Dublin may use any materials, implements, equipment, appliances or tools furnished by or belonging to Service Provider to complete the Work. Dublin shall issue a written notice of termination to Service Provider at the time the Agreement is terminated.

Dublin may also furnish those materials, equipment, and/or employ such workers or subcontractors, as Dublin deems necessary to maintain the orderly progress of the Work. Service Provider hereby consents to the assignment of its subcontracts or agreements which Dublin, in its sole discretion, deems necessary for the orderly progress of the Work, immediately upon the issuance of a determination of default.

All costs incurred by Dublin in performing the Work, shall be deducted from any monies due or to become due Service Provider under this Agreement. Service Provider shall be liable for the payment of any amount by which such expense may exceed the unpaid balance of the Contract Price.

#### Termination for Convenience

Dublin shall have the right to terminate this Agreement for its convenience by providing Service Provider with written notice thereof. Upon Service Provider's receipt of such notification it shall immediately cease work on the Project and take all steps reasonably available to minimize the cost of termination. In the event of such termination, Service Provider shall be entitled to receive as full and complete compensation the value of Work that is properly completed up to the date of termination as identified on the schedule of values, the cost of any stored material not previously paid for or incorporated in the Work which can not be returned or restocked, and reasonable direct costs of demobilization. Service Provider shall not be entitled to compensation for any field or home office overhead or any profit on work not performed.

In the event that any court or arbitration panel should determine that a termination of Service Provider by Contractor for cause was a breach of the Agreement, any such termination shall immediately be converted to a termination for convenience and Service Provider's damages shall be so calculated.

### **Use of Service Provider's Equipment**

If Dublin performs work under this Article, or subcontracts such work to be so performed, Dublin and/or the persons to whom work has been subcontracted shall have the right to take and use any materials, implements, equipment, appliances or tools furnished by, belonging or delivered to Service Provider and located at the Project for the purpose of completing any remaining Work. Immediately upon completion of the Work, any remaining materials, implements, equipment, appliances or tools not consumed or incorporated in performance of the Work, and furnished by, belonging to, or delivered to the Project by or on behalf of Service Provider, shall be returned to Service Provider in substantially the same condition as when they were taken, normal wear and tear excepted.

### **BANKRUPTCY**

#### **Termination Absent Cure**

Should there be filed by or against Service Provider a petition in bankruptcy, or for a reorganization, or should Service Provider become insolvent or be adjudicated as bankrupt or go into receivership, liquidation or dissolution, either voluntarily, involuntarily or under court order, or make a general assignment for the benefit of creditors, or otherwise acknowledge insolvency, then in any such event, each of which shall constitute a default hereunder on the Service Provider's part, Dublin shall have the right, in addition to any other rights and remedies provided by this Agreement, the Contract Documents or by law, to proceed in accordance with the provisions of Article 14 of this Agreement.

#### **Interim Remedies**

If Service Provider is not performing in accordance with the Project Schedule at the time a petition of bankruptcy is filed, or at any subsequent time, Dublin may avail itself of such remedies under this Article as are reasonably necessary to maintain the Project Schedule.

### **EQUAL OPPORTUNITY EMPLOYMENT**

Service Provider shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age or national origin. Service Provider shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, age or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Service Provider agrees to post in conspicuous places, available to employees and applicants for employment, notices, which may be

provided by Dublin setting forth the provisions of this equal opportunity pledge and commitment.

Service Provider shall comply with all provisions of the DPW Regulation on EEO, and the implementing rules, regulations and applicable orders of the State Equal Employment Opportunity Coordinator.

**DUBLIN/OWNER:**

**SERVICE PROVIDER:**

CITY OF DUBLIN, OHIO

\_\_\_\_\_

By:

By: \_\_\_\_\_

\_\_\_\_\_

Its: \_\_\_\_\_

Its:

Date: \_\_\_\_\_

\_\_\_\_\_

Date:

\_\_\_\_\_

APPROVED AS TO FORM:

\_\_\_\_\_

Law Director

Date: \_\_\_\_\_

## PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned (the "Principal") and \_\_\_\_\_ (the "Surety"), are hereby held and firmly bound unto the City of Dublin, Ohio ("Dublin") in an amount not to exceed one hundred percent (100%) of the agreed contract amount for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE ABOVE OBLIGATION is such, that whereas the Principal did on this \_\_\_\_ day of \_\_\_\_\_, **20** \_\_, enter into a contract with Dublin which said contract is made a part of this bond the same as though set forth herein;

NOW, if the Principal shall well and faithfully do and perform the things agreed by the Principal to be done and performed according to the terms of said contract; and shall pay all lawful claims of subcontractors, material men and laborers, for labor performed and materials furnished in the carrying forward, performing or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any material man or laborer having a just claim, as well as for Dublin; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety of any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The Surety for value received, hereby stipulates and agrees that no modifications, omissions, or additions in or to the terms of the contract or to the work to be performed there under or in or to the plans or specifications therefore shall in any wise affect the Surety's obligations on this bond.

Signed this \_\_\_\_\_ day of \_\_\_\_\_, **20**\_\_.

**PRINCIPAL:** \_\_\_\_\_

By: \_\_\_\_\_

*(Signature)*

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**SURETY:** \_\_\_\_\_

By: \_\_\_\_\_

*(Signature)*

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**SURETY AGENT:** \_\_\_\_\_

By: \_\_\_\_\_

*(Signature)*

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: ( ) \_\_\_\_\_

**CERTIFICATION OF FUNDS**

**HOLDER-WRIGHT PARK DEVELOPMENT**

I, Angel Mumma, Director of Finance of the City of Dublin, Ohio, certify that:

1. The Council of the City of Dublin, Ohio has appropriated \$\_\_\_\_\_ for the above-referenced project by Resolution No. \_\_\_\_\_ adopted on \_\_\_\_\_, 20\_\_.
2. The amount so appropriated is on deposit or in the process of collection to the credit of the appropriate fund free from any outstanding obligations.

**CITY OF DUBLIN, OHIO**

Date: \_\_\_\_\_

By: \_\_\_\_\_  
Angel Mumma  
Director of Finance

**NOTICE TO PROCEED  
Not Applicable \_\_\_\_**

**HOLDER-WRIGHT PARK DEVELOPMENT**

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

You are hereby notified to commence work within ten (10) business days from the date of receipt of this Notice to Proceed. You are required to complete the work within **two hundred and forty (240) consecutive calendar days**.

Return an acknowledged copy of this Notice to Proceed to:

**Matt Earman, Director of Parks & Recreation  
Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016**

**CITY OF DUBLIN, OHIO**

Date: \_\_\_\_\_

By: \_\_\_\_\_

**Matt Earman  
Director of Parks & Recreation**

**RECEIPT OF NOTICE TO PROCEED**

Receipt of this Notice to Proceed is hereby acknowledged this \_\_\_\_ day of \_\_\_\_\_, 2016.

Company Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

**NOTICE OF COMMENCEMENT OF PUBLIC IMPROVEMENT**

**Not Applicable** \_\_\_\_

Section 1311.252, Ohio Revised Code

Notice is hereby given of the commencement of a public improvement as follows:

1. The public improvement is identified as:

Project Name: **HOLDER-WRIGHT PARK DEVELOPMENT**

Location:

2. The public authority responsible for the public improvement is:

City of Dublin, Ohio  
5200 Emerald Parkway  
Dublin, Ohio 43017

3. The principal contractor and its surety on the public improvement are as follows:

Principal Contractor: \_\_\_\_\_ Surety: \_\_\_\_\_

Name \_\_\_\_\_ Name \_\_\_\_\_

Address \_\_\_\_\_ Address \_\_\_\_\_

City, State \_\_\_\_\_ City, State \_\_\_\_\_

Zip Code \_\_\_\_\_ Zip Code \_\_\_\_\_

Telephone Number \_\_\_\_\_ Telephone Number \_\_\_\_\_

4. The City of Dublin, Ohio first executed a contract with a principal contractor for the public improvement on \_\_\_\_\_ 2016.

5. The name and address of the representative of the City of Dublin, Ohio upon whom service may be made for the purposes of serving an affidavit pursuant to Section 1311.26 of the Ohio Revised Code is:

**Matt Earman, Director of Parks & Recreation  
Parks & Recreation  
6555 Shier Rings Road  
Dublin, Ohio 43016**

**CITY OF DUBLIN, OHIO**

By: \_\_\_\_\_  
**Matt Earman  
Director of Parks & Recreation**

Sworn to and subscribed before me this \_\_\_\_ day of \_\_\_\_\_, **2016**.

\_\_\_\_\_  
Notary Public

**CHANGE ORDER**

**HOLDER-WRIGHT PARK DEVELOPMENT**

Change Order No. \_\_\_\_\_ Contractor Name: \_\_\_\_\_

Date: \_\_\_\_\_

Agreement Date: \_\_\_\_\_

**The following changes are made to the contract documents:**

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

**The changes are made for the following reasons:**

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

**Change to contract price:**

Original contract amount: \$ \_\_\_\_\_

Current contract amount  
adjusted by previous  
Change Orders: \$ \_\_\_\_\_

The contract will be (circle one:  
increased/decreased) due to this  
Change Order by: \$ \_\_\_\_\_

New contract amount (including  
this Change Order): \$ \_\_\_\_\_

**Change to contract time:**

The contract time will be (circle one: increased/decreased) due to this Change Order by \_\_\_\_\_ calendar days.

The date for completion of all work will be \_\_\_\_\_, **2016**.

This Change Order is signed this \_\_\_\_\_ day of \_\_\_\_\_, **2016**.

**CONTRACTOR**

**CITY OF DUBLIN, OHIO**

\_\_\_\_\_

By: \_\_\_\_\_

Dana L. McDaniel  
City Manager

\_\_\_\_\_

By: \_\_\_\_\_

(signature)

Print Name: \_\_\_\_\_

By: \_\_\_\_\_

Matt Earman  
Director of Parks & Recreation

Title: \_\_\_\_\_

By: \_\_\_\_\_

Angel Mumma  
Director of Finance

**SECTION 4**  
**GENERAL PROVISIONS**

**CITY OF DUBLIN, OHIO**  
**PUBLIC IMPROVEMENTS GENERAL PROVISIONS**

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**CITY OF DUBLIN, OHIO  
STREETS AND HIGHWAYS  
GENERAL PROVISIONS**

**1010 - DEFINITIONS AND TERMS**

Whenever in these general provisions or in other contract documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

**101.01 Abbreviations.** Whenever the following abbreviations are used in these general provisions or in any other contract documents, they are to be construed the same as the respective expressions represented:

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
AREA	American Railway Engineering Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWS	American Welding Society
AWWA	American Water Works Association
CMSC	Construction and Material Specifications - City of Columbus
EI	Edison Electric Institute
FHWA	Federal Highway Administration, Department of Transportation
FSS	Federal Specifications and Standards, General Services Administration
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IMSA	International Municipal Signal Association
IPCEA	Insulated Power Cable Engineering Association
ITE	Institute of Transportation Engineers
NEMA	National Electrical Manufacturers Association
ODOTCMS	Ohio Department of Transportation Construction and Material Specifications
OMUTCD	Ohio Manual of Uniform Traffic Control Devices
OSHA	Occupation Safety & Health Act
UL	Steel Structures Painting Council
	Underwriters' Laboratories, Inc.

Unless otherwise stated in special provisions or in a drawing note, the latest revision of the above standards shall apply.

References made to dated Specifications shall govern, unless the Engineer approves later revisions.

**101.02 Advertisement.** The public announcement, as required by law, inviting bids for work to be performed or materials and equipment to be furnished.

**101.03 Award.** The written acceptance by the City Manager of a bid.

**101.04 Bidder.** Any individual, firm, partnership, or corporation submitting a bid for the advertised work, acting directly or through a duly authorized representative.

**101.05 Borrow Area.** The term borrow area as used in this section refers to locations outside the right-of-way from which natural materials are removed for use in the work.

**101.06 Bridge.** A structure, including supports, erected over a depression or an obstruction, such as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads and having a length measured along the center of roadway of more than twenty feet between the center line of bearing of abutments or extreme limits of openings for multiple boxes.

**101.07 Calendar Day or Day.** Every day shown on the calendar.

**101.08 Certified Test Data.** A test report from an independent laboratory listing test data for the specified requirements for the samples tested and a statement furnished by the Contractor by a person having legal authority to act for the supplier and/or manufacturer of the material that the test report furnished represents the material delivered to the project. The certification shall include the laboratory report number and the number of the project to which the material is delivered. Laboratory reports signed by a registered professional engineer and those signed by other personnel and notarized will be accepted for this purpose.

**101.09 Change Order.** A written order issued by the Director of Parks & Recreation to the Contractor, covering changes in the plans or quantities or both, within or beyond the scope of the contract and establishing the basis of payment and time adjustments for the work affected by the changes.

**101.10 City.** The City of Dublin, Ohio, acting through its Director of Parks & Recreation or properly authorized agents thereof; such agents acting severally within the scope of the particular duties entrusted to them.

**101.11 Completion.** Completion of the project shall occur when all of the following items are completed in compliance with the contract: (1) the work has been satisfactorily completed in all respects; (2) the project is ready for use by the City; and (3) the Contractor has satisfactorily executed and delivered to the Director of Parks & Recreation all documents, certificates and proofs of compliance.

**101.12 Completion Date.** The date, as shown in the proposal, on which the work contemplated shall be completed unless extended by an approved written extension.

**101.13 Conduit.** Any pipe or similar passageway for electricity, gas, water or other utility.

**101.14 Contract.** The agreement between the City and the Contractor as set forth in the contract documents setting forth the obligations of the parties thereunder, including but not limited to, the performance of the work, the furnishing of labor and materials, and the basis of payment.

**101.15 Contract Documents.** The contract documents include the invitation to bid; proposals; affidavits; contract forms and contract bond; General Provisions at the time of the award of the contract; supplemental specifications; special provisions; general and detailed plans; notices to the Contractor; and any change orders and supplemental agreements that are required to complete the construction of the work in an acceptable manner, including authorized extensions of the completion date, all of which constitute one instrument.

**101.16 Contract Bond.** The approved form of security, executed by the Contractor and the Contractor's surety or sureties, guaranteeing complete performance of the contract and all supplemental agreements pertaining thereto and the payment of all legal debts pertaining to the construction of the project.

**101.17 Contract Item (Pay Item).** A specifically described unit of work for which a price is provided in the contract.

**101.18 Contractor.** The individual, firm, partnership, corporation, or other entity contracting with the City for performance of prescribed work, acting directly or through a duly authorized representative.

**101.19 County.** The county in which the work is to be performed.

**101.20 Culvert.** Any structure not classified as a bridge, which provides an opening under the roadway.

**101.21 Department or Division.** All references to "Department," or "Division," or any particular department or division of the City of Dublin, Ohio or any particular department or division of the State of Ohio shall refer to the Parks and Recreation, Parks & Recreation of the City of Dublin, Ohio.

**101.22 Director.** All references to Director shall refer to the Director of Parks & Recreation.

**101.23 Director of Parks & Recreation.** The Director of Parks & Recreation of the City of Dublin, Ohio or the Director of Parks & Recreation designated representative.

**101.24 Equipment.** All machinery and equipment, together with the necessary supplies for upkeep and maintenance, and also tools and apparatus necessary for the proper construction and acceptable completion of the work

**101.25 Extra Work.** An item of work not provided for in the contract as awarded but found essential to the satisfactory completion of the contract within its intended scope.

**101.26 Extra Work Contract.** A contract concerning the performance of work or furnishing of materials involving extra work. Such extra work may be performed at agreed prices or on a force account basis.

**101.27 Fabricator.** The individual, firm, or corporation that fabricates structural metals or prestressed concrete members as an agent of the Contractor.

**101.28 Inspector.** The Director of Parks & Recreation's authorized representative assigned to make detailed inspections of contract performance.

**101.29 Invitation to Bid.** The invitation for proposals for all work or materials on which bids are required. Such Invitation to Bid will indicate with reasonable accuracy the quantity and location of the work to be done or the character and quality of the material and/or equipment to be furnished and the time and place of the opening of proposals.

**101.30 Laboratory.** A reputable testing laboratory that is designated by or acceptable to the Director of Parks & Recreation for rendering testing and inspection services on a contract where these specifications govern.

**101.31 Materials.** Any materials specified for use in the construction of the project and its appurtenances.

**101.32 National Holidays.** New Years Day, January 1; Martin Luther King's Birthday - the third Monday in January; Presidents' Day, the third Monday in February; Memorial Day, the last Monday in May; Independence Day, July 4; Labor Day, the first Monday in September; Thanksgiving Day, the fourth Thursday in November; Christmas Day, December 25.

**101.33 Notice to Proceed.** Written notice by the Director of Parks & Recreation to the Contractor, authorizing the beginning of work.

**101.34 Owner.** The City of Dublin, Ohio.

**101.35 Plans.** The plans, profiles, typical cross-sections, working drawings and supplemental drawings, approved by the Director of Parks & Recreation, or exact reproductions thereof, which show the location, character, dimensions and details of the work.

**101.36 Profile Grade.** The trace of a vertical plane along the centerline of roadway, or as indicated on the plans. Profile grade means either elevation or gradient of such trace according to the context.

**101.37 Project.** The specific section of the work together with all appurtenances and construction to be performed thereon under the contract.

**101.38 Proposal.** The offer of a bidder, on the prescribed form properly signed and guaranteed, to perform the work and to furnish the labor and materials at the prices quoted.

**101.39 Proposal Form.** The approved form on which the City requires bids to be prepared and submitted for the work.

**101.40 Proposal Guaranty.** The security furnished with a bid to guarantee that the bidder will enter into the contract if the bid is accepted.

**101.41 right-of-way.** A general term denoting land, property, or interest therein, usually in a strip, acquired for or devoted to the project.

**101.42 Road.** A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

**101.43 Roadbed.** The graded portion of a highway within top and side slopes, prepared as a foundation for the pavement structure and shoulder.

**101.44 Roadside.** A general term denoting the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

**101.45 Roadside Development.** Those items necessary to the complete highway which provide for the preservation of landscape materials and features; the rehabilitation and protection against erosion of all areas disturbed by construction through seeding, sodding, mulching and the placing of other ground covers; such suitable planting and other improvements as may increase the effectiveness and enhance the appearance of the highway.

**101.46 Roadway.** The portion of a highway or street within limits of construction.

**101.47 Sewer.** Pipe or conduit intended for carrying storm drainage or sanitary drainage.

**101.48 Shoulder.** The portion of the roadway contiguous to the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

**101.49 Sidewalk.** The facility within the public right-of-way primarily constructed for the use of pedestrians.

**101.50 Special Provisions.** Additions and revisions to the standard and supplemental specifications covering conditions peculiar to an individual project.

**101.51 Specifications.** The directions, provisions and requirements contained in General Provisions; all as supplemented by the supplemental specifications and special provisions.

**101.52 State.** The State of Ohio acting through its authorized representative.

**101.53 Street.** A general term denoting a public way for purposes of vehicular travel, including all improvements within the right-of-way such as sidewalks, bikepaths, sewers, and streetlights.

**101.54 Structures.** Bridges, culverts, catch basins, curb inlets, drop inlets, retaining walls, cribbing, manholes, end walls, buildings, curbs, pavements, sewers, water mains, service pipes, under drains, foundation drains and other features which may be encountered in the work and not otherwise classed herein.

**101.55 Subcontractor.** An individual, firm, partnership, corporation or other entity to whom the Contractor sublets part of the contract with the written approval of the Director of Parks & Recreation.

**101.56 Subgrade.** The surface upon which a structure or work and appurtenances are to be constructed.

**101.57 Substructure.** All of that part of a bridge or culvert below the bearings of simple and continuous spans, skewbacks of arches and tops of footings of rigid frames, together with back walls and wings.

**101.58 Superintendent.** The Contractor's authorized representative in responsible charge of the work.

**101.59 Superstructure.** The entire structure except the substructure.

**101.60 Supplemental Specifications.** Detailed specifications supplemental to or superseding these General Provisions or any other provisions.

**101.61 Surety.** The corporation, partnership or individual, other than the Contractor, executing a bond furnished by the Contractor.

**101.62 Titles (or Headings).** The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

**101.63 Water line.** Conduit for carrying public water supply.

**101.64 Work.** The furnishing of all labor, services, materials, equipment, and other incidentals necessary or convenient to the successful completion of the project and the carrying out of all duties and obligations imposed by the contract.

**101.65 Work Days.** Wherever indicated in these specifications, work days are defined as: Monday, Tuesday, Wednesday Thursday, Friday, and Saturday, excluding national holidays.

**101.66 Working Drawings.** Stress sheets, shop drawings, erection plans, false work plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data which the Contractor is required to submit for approval.

**101.67 Interpretations.** In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be, done, if, as, or when, or where contemplated, required, determined, directed, specified authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, approval, approved, disapproved, acceptable, unacceptable, suitable, accepted, satisfactory, unsatisfactory, sufficient, insufficient, rejected, or condemned, it shall be understood as if the expression were followed "by the Director of Parks & Recreation" or "to the Director of Parks & Recreation".

## **1020 - BIDDING REQUIREMENTS AND CONDITIONS**

- 102. 01** Pre-qualification of Bidders
- 102. 02** Availability of Contract Documents
- 102. 03** Proposals
- 102. 04** Interpretation of Quantities in Proposal
- 102. 05** Examination of Plans, Specifications, Special Provisions, and Site of Work
- 102. 06** Preparation of Proposal
- 102. 07** Irregular Proposals
- 102. 08** Proposal Guaranty
- 102. 09** Delivery of Proposals
- 102. 10** Withdrawal of Proposals
- 102. 11** Public Opening of Proposals
- 102. 12** Statement of Materials
- 102. 13** Combination or Conditional Proposals

**102.01 Pre-qualification of Bidders.** Not applicable to this contract.

**102.02 Availability of Contract Documents.** The contract documents are available to prospective bidders at the locations stated in the Invitation to Bid. The prospective bidder will be required to pay the City the sum stated in the Invitation to Bid for each set of the contract documents.

**102.03 Proposals.** The City reserves the right to disqualify or refuse to consider a proposal if a bidder is in default for any of the following reasons:

- (a) More than one proposal for the same work from an individual, partnership, joint venture, corporation or other entity under the same or different name, or corporation under the same name or corporations with one or more of the same persons as officers of such corporations, or corporations who are holding companies, parent companies or holding companies which are subsidiaries of such corporations.
- (b) Evidence of collusion among bidders. Participants in such collusion will receive no recognition as bidders for any future work of the City for a period of three years.
- (c) Bid prices which obviously are unbalanced.
- (d) Lack of competency and/or adequate machinery, plant and other equipment.
- (e) Uncompleted work, whether or not with the City, which, in the judgment of the City, might hinder or prevent the prompt completion of additional work if awarded.
- (f) Failure to comply with the Pre-qualification requirement of 102. 01.
- (g) Failure to perform previous contracts adequately or a breach of prior contracts, whether or not the breach was waived by the City at a prior time.
- (h) Any other reasonable cause.

**102.04 Interpretation of Quantities in Proposal.** Not applicable to this contract.

**102.05 Examination of Plans, Specifications, Special Provisions, and Site of Work.** The bidder is expected to examine carefully the site of the proposed work and the contract documents before submitting a proposal. The bidder may also make additional investigations of subsurface conditions prior to submitting the bid. Such soil tests and investigations shall be at the bidder's expense and at no cost to the City. Any physical variation at the site of the work from that indicated by the contract documents, noted by the Contractor during the required examination or during any additional investigation conducted by the bidder, shall be called to the attention of the Director of Parks & Recreation prior to submitting a proposal. The submission of a proposal shall be considered evidence that the bidder has made such examination and is

satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract documents.

No pleas of ignorance of any provisions of the contract documents or of available subsurface data which may have been obtained by the City or its authorized representatives for use in designing the project shall not be accepted as a basis for any claim for extra compensation, extra work or for any extension of time.

Data concerning subsurface materials or conditions may have been obtained by the City for use in designing the project. Said borings, test excavations, and other subsurface investigations even if incorporated into the plans, if any, are incomplete, are not a part of the contract documents, and are not warranted to show the actual subsurface conditions. Said subsurface data, if not in the plans, is available for review by bidders upon written request and execution of a release for subsurface information. Bidders shall not rely on subsurface information obtained from the City and the City will not be responsible in any way for additional compensation for excavation work performed under the contract due to the Contractor's assumptions or deductions based on said subsurface data. The Contractor agrees that no claims will be made against the City, if, in carrying out the work, it is found that the actual subsurface conditions encountered do not conform to those indicated by said borings, test excavations and other subsurface investigations.

All soil data obtained from the City is for information only and indicates conditions existing at the time of the tests. The information is not guaranteed to be indicative of any subsurface condition except at the particular and exact locations of the borings.

**102.06 Preparation of Proposal.** The bidder shall submit the proposal upon the forms furnished by the City. All the words and figures shall be in ink or typed.

When an item in the proposal contains a choice to be designated by the bidder, the bidder shall indicate that choice in accordance with the specifications for that particular item, and thereafter no further choice will be permitted.

The bidder's proposal must be signed with ink by the individual, by one or more members of the partnership, by one or more members or officers of each firm representing a joint venture, or by one or more officers of a corporation, or by an agent of the Contractor legally qualified and acceptable to the City. If the proposal is made by an individual, the name and business address of that individual must be shown; if as a partnership, the names and business addresses of all general partners must be shown; if as a joint venture, the name and business address of each member of the joint venture must be shown; if by a corporation, the name of the state under the laws of which the corporation is chartered, the name of the corporation and the names and business addresses of its corporate officers must be shown; or if by any other business entity, the names and addresses of the principals of such entity. Anyone signing a proposal on behalf of a corporation must file with the proposal legal evidence of one's authority to do so.

Before a contract will be awarded to a foreign corporation or a person or partnership non-resident of the State of Ohio, such foreign corporation, person, or partnership non-resident shall file with the Secretary of State of Ohio a power of attorney designating his or its agent or the Secretary of State of Ohio, as agent, for the purpose of accepting service of summons, in any action in law or equity, or both, brought in the State of Ohio.

**102.07 Irregular Proposals.** Proposals will be considered irregular and may be rejected for reasons including but not limited to the following:

(a) If the proposal is on a form other than that furnished by the City, or if the form is altered or any part thereof is detached.

(b) If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.

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

(d) If the proposal is not signed by the bidder.

(e) If the proposal is not typed or written legibly in ink.

**102.08 Proposal Guaranty.** No proposal will be considered unless accompanied by a certified check, cashier's check, letter of credit, or a satisfactory bid bond, in an amount not less than ten percent of the bidder's proposal, including the base bid and all alternates conditioned upon execution of the contract and the furnishing of a performance bond in the event the contract is awarded to the bidder.

**102.09 Delivery of Proposal.** The proposal shall be placed, together with the proposal guaranty, in a sealed envelope so marked as to indicate the identity of the project and the name and address of the bidder. If forwarded by mail, said envelope shall then be placed in another envelope which shall be sealed and addressed as indicated in the proposal. Proposals will be received until the hour and date set for the opening thereof and must be in the hands of the official indicated by such time. Proposals received after the time for opening of bids will be returned to the bidder unopened.

**102.10 Withdrawal of Proposals.** No bidder may withdraw his proposal unless a written request to do so is submitted to the Director of Parks & Recreation prior to the time set for opening of the proposals. When such request is received, the proposal will be returned to the bidder unopened.

**102.11 Public Opening of Proposals.** Proposals will be opened and read publicly at the time and place designated by the Director of Parks & Recreation. Bidders, their authorized agents and other interested parties are invited to be present.

**102.12 Statement of Materials.** Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition, and manufacture of any or all materials to be used in the construction of the work together with samples, which samples may be subjected to the tests provided for in the specifications to determine their quality and fitness for the work.

**102.13 Combination or Conditional Proposals.** If the City so elects, proposals may be issued for the project in combination, unless otherwise stated on the proposal form. The City reserves the right to make awards on combination bids or separate bids to the best advantage of the City. No combination bids, other than those specifically stated on the proposal form by the City, will be considered. Separate contracts will be written for each individual project included in the combination.

### **103. - AWARD AND EXECUTION OF CONTRACT**

- 103. 01**        **Consideration of Proposals**
- 103. 02**        **Award of Contract**
- 103. 03**        **Cancellation of Award**
- 103. 04**        **Return of Proposal Guaranty**
- 103. 05**        **Requirement of Contract Bond**
- 103. 06**        **Execution of Contract**
- 103. 07**        **Failure to Execute contract**
- 103. 08**        **Contractor's Insurance**
- 103. 09**        **Fire and Builder's Risk Insurance**
- 103. 10**        **Railroad Protective Insurance**
- 103. 11**        **Workers' Compensation Insurance**

**103.01 Consideration of Proposals.** After the proposals are opened and read, they will be compared on the basis of the summation of the products of the approximate quantities shown in the proposal by the unit bid prices. In the event of a discrepancy between unit bid prices and extensions, the unit price shall govern.

The right is reserved to reject any or all proposals, to waive technicalities or to advertise for new proposals, if in the judgment of the awarding authority the best interests of the City will be promoted thereby.

The City reserves the right to hold proposals for a period of up to sixty days after the opening, and to award a contract at any time during that period.

**103.02 Award of Contract.** The award of the contract, if it be awarded, will be made as soon as is reasonably possible after the opening of the proposals to the lowest and best bidder whose proposal complies with all the requirements prescribed. In no case will an award be made until all necessary investigations are made as to the responsibility of the bidder to whom it intends to award the contract. The successful bidder will receive a Notice of Intent to Award sent to the bidder at the address shown in the proposal stating that its proposal has been accepted by the City.

**103.03 Cancellation of Award.** The City reserves the right to rescind the award of any contract at any time before the execution of said contract by all parties without any liability against the City.

**103.04 Return of Proposal Guaranty.** All proposal guaranties, except those of the three lowest bidders, will be returned immediately following the opening and checking of the proposals. The retained proposal guaranties of the three lowest bidders will be returned within ten days following the award of contract and that of the successful bidder will be returned after a satisfactory performance bond has been furnished and the Agreement for Construction has been executed.

**103.05 Requirement of Performance Bond.** The successful bidder must within ten days after receiving the Notice of Intent to Award and before execution of the Agreement for Construction by the City, furnish a performance bond in the form provided by Ohio Revised Code Section 153. 57 in the full amount of the proposal. Said bond shall cover the entire contract including the guarantee period required under 109. 11. The successful bidder's failure to submit a performance bond with the executed Agreement for Construction shall be deemed a refusal by the bidder to enter into a contract and shall release the City from all obligations to the bidder.

**103.06 Execution of Contract.** The Agreement for Construction shall be signed by the successful bidder and returned, together with the performance bond and other required contract documents, within ten days after the bidder has received the Notice of Intent to Award.

**103.07 Failure to Execute Contract.** Failure of the bidder to execute the Agreement for Construction and file an acceptable performance bond shall be just cause for the cancellation of the award and the forfeiture of the proposal guaranty which shall become the property of the City, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest and best bidder, or the work may be re-advertised as the Director of Parks & Recreation may decide.

**103.08 Contractor's Insurance.**

**(A) General.** The Contractor shall secure and maintain, at his/her own expense, until completion of the contract, general liability and property insurance as shall protect him and the City from claims for personal injury or property damage which may arise because of the nature of the work or from operations under this contract.

**(B) General Liability.** The Contractor shall have General Liability coverage on a per project basis, per occurrence, and in comprehensive form. General Liability coverage shall include Products/Completed Operations, Explosion Underground and Collapse Hazard, Premises Operations, Contractual, Independent Contractors, Broad Form Property Damage and Personal Injury.

The Contractor shall provide General Liability and Excess General Liability coverage in the following amounts, at a minimum:

Projects less than \$1,000,000: Contractor shall have total limits of insurance to include primary and excess coverage in an amount not less than \$2,000,000. (Examples: may be \$1,000,000 primary and \$1,000,000 excess, \$2,000,000 primary, or other equivalent combination.)

Projects greater than \$1,000,000: Contractor shall provide total limits of insurance to include primary and excess coverage in an amount of not less than \$5,000,000. (Examples: may be \$1,000,000 primary and \$4,000,000 excess, \$2,000,000 primary and \$3,000,000 excess, or other equivalent combination.)

**☑ Automobile Liability.** The Contractor shall secure, and maintain, at his/her own expense, until the completion of the Contract, coverage for any auto, including non-owned and hired autos, with a combined single limit of \$1,000,000 per occurrence. The City shall be named as an Additional Insured.

**(D) Workers' Compensation Insurance.** Before beginning work, the Contractor shall furnish to the City satisfactory proof that he/she has, for the period covered under the Contract, full Workers' Compensation coverage for all persons whom he/she may employ directly, or through subcontractors, in carrying out the work contemplated under the Contract, and shall hold the City free and harmless for all personal injuries of all persons whom the Contractor may employ directly or through subcontractors.

**(E) Additional Insured.** The Contractor shall name the City of Dublin, Ohio as an "Additional Insured" on all insurance policies, except Workers' Compensation, and this shall be reflected on the Certificate of Insurance.

**(F) Cancellation Notice or Material Change of Coverage.** The Contractor's required insurance shall be endorsed to provide that the policy(ies) will not be canceled, reduced, discontinued, or otherwise materially altered during the period of performance without thirty (30) days prior written notice to the Director of Parks & Recreation.

**(G) Certificate(s) of Insurance.** Prior to commencing work under each contract or subcontract, certificates of insurance shall be submitted and approved by the City. The Contractor is responsible for obtaining certificates of insurance establishing that the Contractor and all subcontractors have complied with insurance requirements previously stated.

**(H) Rating of Insurance Company(ies).** Any and all insurance company(ies) supplying coverage to the Contractor must have no less than an A- rating in accordance with the A. M. Best rating guide.

#### **104. - SCOPE OF WORK**

- 104.01 Intent of Contract**
- 104.02 Alteration of Plans or Character of the Work**
- 104.03 Extra Work**
- 104.04 Modification of Contract**
- 104.05 Maintenance of Traffic and Accessibility to Utilities**
- 104.06 Materials Found on the Work Site**
- 104.07 Final Cleaning Up**

**104.01 Intent of Contract.** The intent of the contract is to provide for the construction and completion in every detail of the work described. The Contractor shall perform all items of work covered and stipulated in the proposal and perform altered and extra work, furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the plans, specifications and terms of the contract. Should any misunderstanding arise as to the intent or meaning of the plans, specifications, special provisions or proposal, or any discrepancy appear, the decision of the Director of Parks & Recreation shall be final and conclusive.

**104.02 Alteration of Plans or Character of the Work.** The City reserves the right to make, at any time during the progress of the work, such increases or decreases in quantities and such alterations in the details of construction, including alterations or alignments of road structures, grades, etc..., as may be found to be necessary or desirable. Such increases or decreases and alterations shall not invalidate the contract nor release the surety, and the Contractor agrees to perform the altered work the same as if it had been a part of the original contract. The Contractor shall insure that coverage provided by the surety is maintained at the same value as the altered project value.

Unless such alterations and increases or decreases materially change the character of the work to be performed or the cost thereof, the altered work shall be paid for at the same unit prices as other parts of the work. In this case, all expenses for increased alterations and increased costs shall be borne solely by the Contractor. If, however, the character of the work or the unit costs thereof are materially changed, an allowance shall be made on such basis as may have been agreed to in advance of the performance of the work, or in case no such basis has been

previously agreed upon, then an allowance shall be made, either for or against the Contractor, in such amount as the Director of Parks & Recreation may determine to be fair and equitable.

Should the Contractor encounter or the Director of Parks & Recreation discover during the progress of the work or any conditions at the site differing materially from those indicated in this contract, or unknown physical conditions at the site of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract the Director of Parks & Recreation shall be promptly notified in writing of such conditions before they are disturbed. The Director of Parks & Recreation will thereupon promptly cause the investigation of conditions and if they are found to so materially differ and cause an increase or decrease in the cost of, or the time required for performance of the contract, an equitable adjustment will be made.

Latent physical subsurface conditions such as abandoned public and private utilities, ancient foundations or other such man-made structures of which the City and the Contractor could not have been aware, or reasonably could not have been aware of at the time of the execution of the contract, may qualify for adjustment in time of completion and increased cost of construction, all of which must be documented by the Contractor and submitted to the Director of Parks & Recreation for approval.

Any adjustment in compensation because of a change or changes resulting from one or more of the conditions described in the foregoing paragraphs will be made in accordance with the provisions of 104. 03 and 104. 04. Any adjustment in contract time because of changes will be made in accordance with the provisions of 108. 06.

**104.03 Extra Work.** Subject to 104. 04, the Contractor shall perform unforeseen work, for which there is no price included in the contract, whenever it is deemed necessary or desirable in order to complete fully the work as contemplated. Such work shall be performed in accordance with the specifications and as directed, and will be paid for as provided under 109. 04.

**104.04 Modification of Contract.** When it becomes necessary in the opinion of the Director of Parks & Recreation, in the prosecution of any work or improvement under contract, that alterations or extra work are needed, the same shall only be made upon a written change order approved by the City Manager. No such change order shall be effective until the price to be paid for the work or material, or both, under the altered or modified contract shall have been agreed upon in writing and signed by the Contractor and the City Manager on behalf of the City.

The Contractor shall have no claim for and nor be entitled to compensation for any such alterations or extra work until the same have been incorporated into appropriate change orders. All such change orders must be approved by the City Manager and have an appropriate Certification of Funds by the Finance Director of Dublin attached to the change order.

**104.05 Maintenance of Traffic and Accessibility to Utilities.** The Contractor shall at all times provide and maintain access to fire hydrants, water valves, water service boxes, gas valves, gas, service boxes, manholes and other similar appurtenances.

When so stated on the plans or in the proposal, public traffic shall be maintained during construction. This may be traffic through the project or it may be only cross traffic at intersections. Maintenance of traffic may be required only at certain stages of construction or at all times, if so noted.

At locations on the work where sewer or water line construction only is called for and a part of the existing pavement will remain in place, traffic will be maintained and ingress and egress to all public and private entrances shall be provided.

In the event of the complete closure of any street, alley or private drive, the Contractor shall notify the occupants of all premises affected by such closure as per 614. 04 of the CMSC.

Whenever the Contractor, for any reason, ceases operations on this contract for a period of fifteen or more calendar days, the Contractor, if so directed by the Director of Parks & Recreation, shall construct a temporary roadway to provide access to the premises affected by project operations. The temporary roadway shall be constructed of cinders, gravel, crushed stone or other acceptable materials and of suitable width and thickness to carry anticipated vehicles, as directed by the Director of Parks & Recreation. The temporary roadway shall be maintained by the Contractor in serviceable condition until such time that the contract work is resumed. The cost of constructing and maintaining the temporary roadway shall be borne by the Contractor.

Failure of the Contractor to perform the operations stated in this section when directed by the Director of Parks & Recreation, within a reasonable time as determined by the Director of Parks & Recreation, will give the City authority to perform the work and bill the cost of same to the Contractor.

All traffic control devices shall be furnished, erected, maintained and removed by the Contractor in accordance with the OMUTCD and paid for in accordance with the provisions of 614 of the CMSC. When the proposal does not include the cost of maintaining traffic, this work shall be performed but will not be paid for directly, and the cost of this work shall be included in the price bid for various items in the proposal. The provisions of these items and this section shall not in any way relieve the Contractor of any of his legal responsibilities or liabilities for the safety of the public. The attention of the bidder is directed to the provisions of 107. 02 (Permits, Licenses, and Taxes) and 107. 08 (Public Convenience and Safety).

**104.06 Materials Found on the Work Site.** The Contractor may use stone, gravel, sand or other material found on the work site subject to approval by the Director of Parks & Recreation. The Contractor shall be paid for the excavation of such stone, gravel, sand or other material at the unit prices set forth in the proposal for such items; provided however that the cost of any

additional inspections directed by the Director of Parks & Recreation for such materials shall be deducted from the payments to the Contractor for such materials. The Contractor, at its expense, shall replace the material removed with material approved by the Director of Parks & Recreation. The Contractor shall not excavate or remove any material from within the project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the Director of Parks & Recreation.

Unless otherwise provided, the material from any existing old structure may be used temporarily by the Contractor in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the Director of Parks & Recreation.

**104.07 Final Cleaning Up.** Before final acceptance, all ground occupied by the Contractor in connection with the work shall be cleaned of all rubbish, excess materials, temporary structures, and equipment. These areas shall have suitable vegetative cover established by seeding and mulching or sodding as required by 659 or 660 of the CMSC, the cost of which to be included in various items bid, unless a separate bid item is provided in the proposal, and all parts of the work shall be left in an acceptable condition.

## **105. - CONTROL OF WORK**

- 105. 01 Authority of the Director of Parks & Recreation**
- 105. 02 Plans and Working Drawings**
- 105. 03 Conformity with Plans and Specifications**
- 105. 04 Coordination of Plans, Specifications, Supplemental Specifications and Special Provisions**
- 105. 05 Cooperation by Contractor**
- 105. 06 Night Work and Sundays**
- 105. 07 Work on National Holidays**
- 105. 08 Cooperation with Utilities**
- 105. 09 Cooperation Between Contractors**
- 105. 10 Construction Stakes, Lines and Grades**
- 105. 11 Photographs and Videos**
- 105. 12 Authority and Duties of the Inspector**
- 105. 13 Inspection of Work**
- 105. 14 Unauthorized Work**
- 105. 15 Load Restrictions**
- 105. 16 Maintenance During Construction**
- 105. 17 Failure to Maintain Roadway or Structures, Traffic Control Facilities and Other Appurtenances**
- 105. 18 Borrow and Waste Areas**
- 105. 19 Use of Fire Hydrants**
- 105. 20 Claims**
- 105. 21 Moving of Equipment**

**105.01 Authority of the Director of Parks & Recreation.** The Director of Parks & Recreation will decide all questions which may arise as to the quality and acceptability of materials furnished, work performed and rate of progress; all questions which may arise as to conformity with plans, specifications and other contract documents; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions which may arise as to interpretation of the plans, specifications, and other contract documents.

The Director of Parks & Recreation has immediate charge of the engineering details of each construction project and is responsible to insure that the Contractor satisfactorily administers and completes the project. The Director of Parks & Recreation has the authority to reject defective material and to suspend any work that is being improperly performed.

The Director of Parks & Recreation will have the authority to suspend the work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workers or the general public; for failure to carry out provisions of the contract; for failure to carry out orders; and for such periods as may be deemed necessary due to unsuitable weather. The suspension of the work for the above reasons does not relieve the Contractor of responsibility according to 107.14.

In the event the Director of Parks & Recreation orders the work suspended for unsafe conditions (whether they be unsafe to workers or the public), unsuitable weather, use of defective material not in conformity with the specifications or because work is being improperly performed, the expense, whether direct or indirect, for such suspension shall be borne solely by the Contractor.

**105.02 Plans and Working Drawings.** The plans will show location and design details of all structures, lines, grades, and typical cross sections of roadways, conduits and all other items required by the contract. The Contractor shall keep one set of the plans available at the project site at all times.

The Contractor shall be responsible for the furnishing of copies of plans, specifications and special provisions, or the necessary portions thereof, to subcontractors and parties furnishing labor, materials and equipment for the project.

The plans will be supplemented by such working drawings as are necessary to adequately control the work. Working drawings for structures shall be furnished by the Contractor and shall consist of such detailed plans as may be required to adequately control the work and are not included in the plans furnished by the City. All working drawings must be approved by the Director of Parks & Recreation and such approval shall not operate to relieve the Contractor of any responsibility under the contract for the successful completion of the work. Where work consists of repairs, extensions or alterations of existing structures, the Contractor shall make such measurements of original construction as may be required to accurately join old and new work. Any measurements which may appear upon the plans to indicate the extent and nature of such repair or extension shall not relieve the Contractor of this responsibility.

The contract price will include the cost of furnishing all working drawings.

**105.03 Conformity with Plans and Specifications.** All work performed and all materials furnished shall be in conformity with the lines, grades, cross sections, dimensions and material requirements, including tolerances, shown on the plans or indicated in the specifications.

In the event that the Director of Parks & Recreation finds the materials, or the finished product in which the materials are used, not in conformity with the plans and specifications, but that acceptable work has been produced, the Director of Parks & Recreation shall then make a determination if the work shall be accepted and remain in place. In this event, the Director of Parks & Recreation will document the basis of acceptance by change order which will provide for an appropriate adjustment in the contract price for such work or materials as the Director of Parks & Recreation deems necessary.

In the event the Director of Parks & Recreation finds the materials of the finished product in which the materials are used or the work performed are not in conformity with the plans and specifications and have resulted in an inferior or unsatisfactory product, the work or materials shall be removed, replaced or otherwise re-mediated by, and at the expense of, the Contractor.

Failure of the Contractor to follow the order of the Director of Parks & Recreation pursuant to this section shall give the City the unqualified right to remove, replace, or otherwise remediate the defective work or materials any and all expense incurred by the City, directly or indirectly, shall be deducted or billed to the Contractor at the option of the Director of Parks & Recreation.

**105.04 Coordination of Plans, Specifications, Supplemental Specifications and Special Provisions.** The specifications, the supplemental specifications, the plans, special provisions, proposal, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary and to describe and provide for a complete work. In case of discrepancy, calculated dimensions will govern over scaled dimensions, plan notes will govern over specifications, supplemental specifications will govern over specifications; proposals and special provisions will govern over both specifications and plans.

The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, it shall immediately be made known to the Director of Parks & Recreation. The Director of Parks & Recreation will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

**105.05 Cooperation by Contractor.** The Contractor must obtain one copy of the specifications and two sets of the plans at the Contractor's own cost and keep available at least one set of the specifications, the plans and all other contract documents including special provisions at the project site at all times.

Unless otherwise provided for in the plans or proposal, no work shall be commenced under this contract until a pre-construction conference has been held. In general, fourteen days are required to notify all interested parties of a pre-construction conference. Upon confirmation of a valid contract, the Director of Parks & Recreation will fax or mail, via U.S. postal service-first class, pre-construction conference notices to all parties. The Contractor shall take due note of this requirement and aid in the timely scheduling of the pre-construction conference to avoid unnecessary delays in the commencement of the work. Following the pre-construction conference, the Director of Parks & Recreation will issue a Notice to Proceed to the Contractor. The Contractor is required to commence work within ten days from the date of receipt of the Notice to Proceed.

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof, and shall cooperate with the Director of Parks & Recreation, inspectors and other Contractors in every way possible.

The Contractor shall have on the project at all times a competent superintendent, acting as an authorized agent, capable of reading and thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed, who shall receive instructions from the Director of Parks & Recreation or an authorized representative. The superintendent shall have the full authority to execute orders or directions of the Director of Parks & Recreation without delay and to promptly supply such materials, equipment, tools, labor and incidentals as may be required. Such superintendence shall be furnished irrespective of the amount of work sublet.

Where the work extends across private property, the Contractor shall conduct operations in strict conformity with the terms and conditions of the easements and agreements obtained from the owners of the property. The City will not provide any points of access to any of these easements other than at points shown or described in the agreement with the property owner. Arrangements for the use of any additional points of access shall be made with the property owners by the Contractor at the Contractor's own expense.

The Contractor agrees to confine the work under this contract to the strict dimensions of easements, rights-of-way, or other work area authorized in writing by the City. Any failure of the Contractor, or the Contractor's agents, servants and employees to restrict the work in the defined area shall be the sole liability and responsibility of the Contractor who further agrees to save the City harmless from any activity of the Contractor's agents, servants, employees and subcontractors where such activity concerning work under this contract extends beyond the defined work area. The Contractor also agrees that where operations extend outside prescribed work areas, the City has the absolute right to suspend the work unless written evidence indicates permission from the property owner.

If the Contractor disperses any or all of its equipment to an area outside the work limits of the project, for any reason whatsoever, the re-marshaling and re-grouping of the equipment back to the work area shall be at the Contractor's expense. If the Contractor has been granted

permission by the Director of Parks & Recreation to remove said equipment from the work area, then, at the discretion of the Director of Parks & Recreation, consideration may be given as to the amount of the City's participation, if any.

**105.06 Night Work and Sundays.** The Contractor agrees that all work on this contract which includes any and all subcontractors shall be only during the period from one-half hour before sunrise and one-half hour after sunset as sunrise and sunset are determined by the U. S National Weather Service.

No work shall be permitted on Sundays unless authorized by the Director of Parks & Recreation.

Authorization of work during any other time shall only be upon written permission by the Director of Parks & Recreation, or as detailed on the plans or in the proposal, special provisions or supplemental specifications.

Failure of the Contractor to comply or failure of the Contractor to control any and all of his subcontractors for work under the contract to comply with the above provisions shall be cause to make all such work performed subject to removal and replacement at no additional expense to the City.

**105.07 Work on National Holidays.** No work will be permitted on National Holidays as listed in 101. 33 except as authorized or directed by the Director of Parks & Recreation. The provisions of 105. 06 shall apply with equal force to this provision.

**105.08 Cooperation with Utilities.** During the course of plan preparation for an improvement, the City shall notify all utility companies, all pipe line owners or other parties affected and endeavor to have all necessary adjustments of the public or private utility fixtures, pipe lines and other appurtenances within or adjacent to the limits of construction made as soon as possible so as not to interfere with the progress of the work. During the course of construction, the Contractor shall be solely responsible for notifying any utility or other service when such service is encountered as provided hereinafter.

The Contractor shall be solely and completely responsible for all above ground utilities, structures, and appurtenances, in regard to protection or replacement of same. The Contractor shall also be solely responsible for below ground utilities, structures, and appurtenances that may be accurately located by removing manhole covers, valve box covers, and other access point coverings, with reasonable effort using hand tools for such removal. The cost of protecting and/or replacing the utilities, structures, and appurtenances covered by this paragraph shall be borne solely by the Contractor and included in the various bid items in the contract.

Existing surface or overhead structures or utility lines are not necessarily shown on the drawings and those shown are only approximately correct. The Contractor shall make such

investigations as are necessary to determine the extent to which existing surface or overhead structures may interfere with the prosecution of the work contemplated under this contract.

Existing subsurface structures or utility lines including sewer service connections but excluding all other service connections, which may be encountered during the construction of the work embraced under this contract or are located in such close proximity to the work under this contract as to require special precautions or methods for their protection, such as sewers, drains, sewage force mains, water mains, gas mains, telephone and electric conduits, together with appurtenances, are shown in the plans and drawings, insofar as there is public record of their existence. The sizes, locations and depths shown are only approximately correct and the Contractor shall make such investigations or explorations as may be necessary to verify the accuracy of the information given. Furthermore, it is recognized that the exact locations of water mains are unknown, hence the Contractor shall, if so ordered, uncover and locate these mains ahead of the excavation for the work required by these specifications.

In accordance with Ohio Revised Code Section 153. 64, at least two working days prior to commencing construction operations, the Contractor shall notify the Director of Parks & Recreation, the registered utility protection service and the owners of each underground and overhead utility facility not members of the registered utility protection service.

Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cable-ways, signals and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners at their expense, except as otherwise provided for in the special provisions or as noted on the plans.

Water mains, services and appurtenances owned and/or maintained by the Division of Water, Department of Public Utilities, City of Columbus, Ohio shall be adjusted as indicated on the drawings or as specified at the Contractor's cost and expense in a manner approved by the Division of Water Department of Public Utilities, City of Columbus, Ohio, and no separate payment will be made unless a separate item is included in the contract therefore.

It is understood and agreed that the Contractor has considered in the Contractor's proposal all permanent and temporary utility appurtenances in their present or relocated positions and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by the Contractor due to any interference from said utility appurtenances or the operation of moving them, except that in those cases where, after written notification from the Contractor, the Director of Parks & Recreation determines that the character of the work to be performed or the cost thereof or the time provided therefore has been materially changed by such delays without the fault or negligence of the Contractor, an equitable adjustment shall be made.

If, through no fault of the Contractor, the progress of contract work is delayed for an unreasonable length of time from that proposed in the progress schedule of 108. 02 because of failure of a utility company to relocate or adjust its lines, the Contractor shall immediately file

with the City a detailed statement describing the nature of the delay and its effect upon contract work progress.

It is the complete responsibility of the Contractor to determine the exact location of all substructures and utility lines of public utility facilities including but not limited to water, sewer, traffic, and electricity pipes or conduits shown on the plans including services lines not shown whether or not located on private property, public property, public or private right of ways, or public or private easements and of all surface or overhead structures, including but not limited to utility lines, telephone or electrical poles, growing things such as trees, sidewalks and driveways.

The Contractor shall have sole responsibility for paying for any damage done directly or indirectly to the above mentioned items as a result of the progress of the work performed under this contract, whether performed by the Contractor or the Contractor's subcontractor(s), agents, servants or employees, whether such damage results from negligence or otherwise, and whether the damage is to private or public property or real or personal property. The Contractor further agrees to save the City harmless from any such damages.

In the event that the Contractor fails to pay the entire cost of the damages as stated above within thirty days, or in the event litigation arises as a result of such damages, the Director of Parks & Recreation shall have the unqualified right to deduct and withhold the entire amount of the damages from the monies due or to become due to the Contractor until said damages are liquidated and the City is kept whole from any such expense.

The Contractor further covenants not to sue the City, either in law or equity, where such deduction and withholding is made by the City.

The City shall return, within a reasonable time thereafter not to exceed thirty days, the amount of the withheld funds which exceed the amount of damages paid by the City.

The Contractor further waives any and all rights, title or interest in any and all amounts of damages and court costs paid by the City.

**105.09 Cooperation Between Contractors.** The City reserves the right at any time to contract for and perform other or additional work on or near the work covered by the contract.

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

Each contractor involved shall assume all liability, financial or otherwise, in connection with his contract and shall protect and save harmless the City from any and all damages or claims that

may arise because of inconvenience, delay, or loss experienced by him because of the presence and operations of other contractors working within the limits of the same project.

Each contractor shall arrange its work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same project. Each contractor shall join their work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

**105.10 Construction Stakes, Lines and Grades.** The Contractor shall furnish and place construction layout stakes for the project in accordance with 623 of the CMSC. The Contractor shall notify the City at least two working days prior to the time that control points for line and grade will be needed. There shall be no compensation to the Contractor for the cost occasioned by delay in establishing lines, grades and elevations or making other necessary measurements or by inspection; but such costs shall be considered as having been included in the price stipulated for doing the work called for in the contract.

All construction staking shall be performed under the supervision of a registered professional engineer or land surveyor. All field notes, cut sheets, etc. , shall be submitted to the City.

**105.11 Photographs and Videos.** From time to time during the progress of the work, photographs or videos of the work may be taken by the Director of Parks & Recreation, inspectors or other duly authorized City personnel or agents, at no expense to the Contractor. The Contractor shall, however, furnish access to the work at all times for this purpose and shall furnish such assistance as may be required. The photographs or videos thus taken shall be the property of the City. Nothing herein contained shall be construed as prohibiting the taking of photographs or videos by the Contractor or its agents, provided, however, that it is done at no cost or expense to the City.

**105.12 Authority and Duties of the Inspector.** Inspectors employed by the City will be authorized to inspect all work and materials furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. Inspectors are not authorized to alter or waive the provisions of the contract, but shall have the authority to reject materials which do not meet specification requirements and to suspend the portion of the work involved until any question at issue can be referred to and decided by the Director of Parks & Recreation. Inspectors are not authorized to issue instructions contrary to the plans and specifications, or to act for the Contractor.

**105.13 Inspection of Work.** All materials and each part or detail of the work shall be subject to inspection by the Director of Parks & Recreation. The Director of Parks & Recreation or an authorized representative of the Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

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

Any work done or materials used without supervision or inspection by the Director of Parks & Recreation or an authorized representative of the Director of Parks & Recreation may be ordered removed and replaced at the Contractor's expense. Failure to reject any defective work or material shall not in any way prevent later rejection when such defects be discovered, or obligate the City to final acceptance.

When any unit of government or political subdivision or railroad or any corporation is to pay a portion of the cost of the work covered by this contract, its respective representatives shall have the right to inspect the work. Such inspection shall in no sense make any unit of government or political subdivision or railroad or any corporation a part to this contract, and shall in no way interfere with the rights of either party hereunder.

**105.14 Unauthorized Work.** No work shall be done without control points having been given by the City. Work done contrary to the instructions of the Director of Parks & Recreation, work done beyond the control points, or any extra work done without authority will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

Upon failure on the part of the Contractor to comply with any order of the Director of Parks & Recreation under the provisions of this section, the Director of Parks & Recreation will have authority to cause unauthorized work to be removed and to deduct the costs from any monies due or to become due to the Contractor.

**105.15 Load Restrictions.** The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads. A special permit will not relieve the Contractor from the Contractor's sole liability for damage which may result from the moving of equipment or materials, whether caused by the equipment of the Contractor or the Contractor's subcontractors.

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

load limits be exceeded unless permitted in writing. The Contractor shall be responsible for all damage done by the equipment of the Contractor or the Contractor's subcontractors.

**105.16 Maintenance During Construction.** The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces to the end that the roadway, conduits or structures are kept in satisfactory condition at all times.

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

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

**105.17 Failure to Maintain Roadway or Structures, Traffic Control Facilities and Other Appurtenance.** If the Contractor, at any time, fails to comply with the provisions of 105. 17, the Director of Parks & Recreation will immediately notify the Contractor of such non-compliance. If the Contractor fails to remedy unsatisfactory maintenance within twenty-four hours after receipt of such notice, the Director of Parks & Recreation may immediately proceed to maintain the project and the entire cost of this maintenance will be deducted from monies due or to become due the Contractor on this contract.

**105.18 Borrow and Waste Areas.** The terms "borrow area" and "waste area" as used in the specifications refer to locations outside the right-of-way from which natural materials are removed for use in the work or upon which materials from the work are to be deposited as waste.

Before any borrow or waste disposal operations are to begin, the Contractor shall submit his plan for operation, control of drainage water, cleanup, shaping, and restoration of the disturbed areas and obtain the Director of Parks & Recreation's written approval. The plan of operations shall include the saving of topsoil, and proposed measures to keep sediment and other contaminants from entering streams, lakes, and reservoirs by the use of methods such as diversion channels, dikes, sediment traps, and vegetation covers, etc. When it becomes necessary to locate such areas in or near streams, special precautions shall be taken.

The stability of borrow and waste areas and any damage to surrounding property resulting from movement of the area shall be the sole responsibility of the Contractor.

Restoration of all borrow or waste areas shall include cleanup, shaping, replacement of topsoil and establishment of vegetation cover by seeding and mulching in accordance with the requirements of 659 of the CMSC at no additional cost to the City. The restored area shall be well drained unless approval is given to convert a pit area into a pond or lake, in which case

restoration measures shall be confined to the disturbed areas above the anticipated normal water level.

The cost of work described herein necessary to secure these results shall be included in the contract price bid for these items to which they apply.

**105.19 Use of Fire Hydrants.** The Contractor shall make the proper arrangements with the Dublin Service Department and the Division of Water, Department of Public Utilities, City of Columbus, Ohio for the use of fire hydrants when used for work performed under this contract.

Before the final estimate is paid, the Contractor shall submit a letter from the Division of Water, Department of Public Utilities, City of Columbus, Ohio, to the Director of Parks & Recreation stating that the Contractor and all subcontractors have returned the Siamese Valve to the Division of Water, Department of Public Utilities, City of Columbus, Ohio, and paid all costs arising from the use of the fire hydrants.

**105.20 Claims.**

**(A) Early Notice.** In the event the Contractor learns of circumstances ("Circumstances") perceived by the Contractor to be likely to give rise to a claim, the Contractor shall immediately inform the Director of Parks & Recreation of the Circumstances ("Early Notice"). The Contractor waives any part of the claim for costs incurred from the time the Contractor learns of the Circumstances and before the Contractor notifies the Director of Parks & Recreation of same.

**Notice of Claim.** In the event the Contractor and the Director of Parks & Recreation disagree as to the responsibility of the parties under the contract concerning the Circumstances ("Disagreement"), then the Contractor shall submit to the Director of Parks & Recreation in writing within ten calendar days after the Contractor learns of the Disagreement, a Notice of Claim setting forth insofar as possible, the basis and the nature of the claim. The failure of the Contractor to timely submit a Notice of Claim constitutes a waiver of his right to any claim due to the Circumstances.

**Estimates of Additional Costs and/or Time.** Within ten calendar days of the date of submission of the Notice of Claim, the Contractor shall submit in writing to the Director of Parks & Recreation the Contractor's estimate of the additional cost to be incurred and any additional time required. If the Contractor fails to submit his estimate of additional cost and/or any additional time required within ten calendar days or such later date as agreed to with the Director of Parks & Recreation, the claim is abandoned and waived.

**Records.** From the time the Contractor learns of the Circumstances, the Contractor shall maintain complete and specific records of all matters relating to the preserved claim. The Director of Parks & Recreation shall have access to such records upon request.

**Continuation of Work.** Unless otherwise agreed to in writing, the Contractor shall, after giving Early Notice, continue with and carry on the work during the pendency of the claim, and the City will continue to make progress payments to the Contractor in accordance with the contract documents.

**(B) Submission of Claim.** As promptly as possible following the submission of the Notice of Claim, but in no event later than sixty calendar days after substantially all of the Contractor's costs are known to a reasonable certainty, the Contractor shall submit the claim to the Director of Parks & Recreation. If the Contractor fails to submit the claim within said sixty calendar days or such later date as agreed to with the Director of Parks & Recreation, the claim is abandoned and waived.

**Content of Claim.** The claim shall set forth clearly and in detail, for each item of additional compensation or extension of time requested:

- (a) The reasons for the claim.
- (b) References to the applicable provisions of the contract documents.
- (c) The nature and the specific cost ascribed to each element of the claim and for each period of time involved.
- (d) The basis used in describing each such element of cost or for each period of time.
- (e) Any other pertinent factual data.

Any claim, which in the opinion of the Director of Parks & Recreation is deficient in documentation, shall either be returned to the Contractor with comment as regards to the deficiencies or the Director of Parks & Recreation may, at the Director of Parks & Recreation's option, request additional information. The Contractor shall either furnish the additional information requested by the Director of Parks & Recreation within fifteen days of the request or such later time as agreed to with the Director of Parks & Recreation or state in writing to the Director of Parks & Recreation that the Contractor cannot or will not furnish such additional information, or the claim is abandoned and waived.

**(C) The Decision of the Director of Parks & Recreation.** The Director of Parks & Recreation shall render a written decision within sixty calendar days of the later of the date of receipt of the claim or the date of receipt of the supplemental information requested by the Director of Parks & Recreation. A failure of the Director of Parks & Recreation to render a decision within said sixty calendar days or such later time as agreed to with the Contractor constitutes a decision of denial. The decision of the Director of Parks & Recreation is final subject to an election by the Engineer to submit the matter to an alternative form of dispute resolution.

**(D) Alternative Dispute Resolution.** At the Director of Parks & Recreation's option and direction, the claim shall be submitted to arbitration, mediation, or some other form of alternative dispute resolution.

**105.21 Moving of Equipment.** Non-rubber tired vehicles or equipment shall not be moved on City streets. Exceptions may be granted by the Director of Parks & Recreation where short distances and special circumstances are involved. Exceptions must be in writing and any resulting damage must be repaired to the satisfaction of the Director of Parks & Recreation.

## **106. - CONTROL OF MATERIAL**

- 106. 01 Source of Supply and Quality Requirements**
- 106. 02 Samples, Tests, Cited Specifications**
- 106. 03 Plant Inspection**
- 106. 04 Storage of Materials**
- 106. 05 Handling of Materials**
- 106. 06 Unacceptable Materials**
- 106. 07 City-Furnished Material**

**106.01 Source of Supply and Quality Requirements.** The materials used on the work shall meet all requirements of the contract. In order to expedite the inspection and testing of materials, the Contractor shall notify the Director of Parks & Recreation of the proposed sources of materials prior to delivery. At the option of the Director of Parks & Recreation, materials may be inspected at the source of supply before delivery is started. If it is determined by the Director of Parks & Recreation after trial, that sources of supply for previously approved materials do not produce specified products the Contractor shall furnish materials from other sources which shall, in turn, be subject to controls set forth herein.

The Contractor shall furnish or cause to be furnished delivery tickets or documents for all materials to be incorporated in the work, which tickets or documents shall describe in detail the type, size, specification or data, fully denoting the material being delivered.

**106.02 Samples, Tests, Cited Specifications.** All materials will be inspected, tested and compliance determined by the Director of Parks & Recreation before incorporation into the work. Unless otherwise designated, tests shall be made in accordance with AASHTO, ASTM or other methods on file in the Office of the Engineer. Except as provided in 105. 03, tests shall be made at the expense of the City. Samples will be taken by a qualified representative of the City.

References included in these specifications to AASHTO, ASTM or Federal Specifications shall be the test method, sampling method or specification as amended to its issue date next preceding the bid opening date.

All materials being used are subject to inspection, test or rejection at any time prior to incorporation into the work. Copies of all tests will be furnished to the Contractor's representative. The Contractor, in all cases, shall furnish the required samples without charge.

Transports and distributors hauling bituminous material shall be equipped with an approved submerged bituminous material sampling device.

If, in the judgment of the Director of Parks & Recreation, the quantity used of any one material is so inconsequential as to not warrant testing in accordance with the minimum requirements for sampling materials in Chapter 900 of the CMSC, verification of the quality of the material may be covered by a Field Inspection Report of Materials, prepared by the Director of Parks & Recreation.

**106.03 Plant Inspection.** The Director of Parks & Recreation or an authorized representative may undertake the inspection of materials at the source.

In the event plant inspection is undertaken the following conditions shall be met:

(a) The Director of Parks & Recreation shall have the cooperation and assistance of the Contractor and the producer with whom he has contracted for materials.

(b) The Director of Parks & Recreation or an authorized representative shall have full entry at all times to such parts of the plant as may concern the manufacture or production of the materials being furnished.

☐ If required by the Director of Parks & Recreation, the Contractor shall arrange for an approved building for the use of the inspector; such building to be located conveniently near the plant, independent of any building used by the material producer.

(d) Adequate safety measures shall be provided and maintained.

It is understood that the City reserves the right to re-test all materials prior to incorporation into the work which have been tested and accepted at the source of supply after the same have been delivered and to reject all materials which, when re-tested, do not meet the requirements of the specifications, or those established for the specific project.

**106.04 Storage of Materials.** Materials shall be so stored as to assure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, may again be inspected prior to their use in the work. Stored materials shall be located so as to facilitate their prompt inspection. Approved portions of the right-of-way may be used for storage purposes and for the placing of the Contractor's plant and equipment, but any additional space required therefor must be provided by the Contractor at no expense to the City. Private property shall not be used for storage purposes without written permission of the owner or lessee, and if requested by the Director of Parks & Recreation, copies of such written

permission shall be furnished. All storage sites shall be restored to their original condition by the Contractor at no expense to the City.

**106.05 Handling of Materials.** All materials shall be handled in such manner as to preserve their quality and fitness for the work. Aggregate shall be transported from the storage site to the work in tight vehicles so constructed as to prevent loss or segregation of materials after loading and measuring in order that there may be no inconsistencies in the quantities of materials intended for incorporation in the work as loaded, and the quantities as actually received at the place of operations.

**106.06 Unacceptable Materials.** All materials not conforming to the requirements of the specifications at the time they are used shall be considered unacceptable and shall be removed immediately from the site of the work unless otherwise instructed by the Director of Parks & Recreation. No materials, the defects of which have been corrected, shall be used until approval has been given. Upon failure on the part of the Contractor to comply immediately with any order of the Director of Parks & Recreation made under the provisions of this section, the Director of Parks & Recreation shall have authority to remove and replace defective materials and to deduct the cost of removal and replacement from any monies due or to become due to the Contractor.

**106.07 City-Furnished Material.** The Contractor shall furnish all materials required to complete the work, except when otherwise provided in the proposal.

Materials furnished by the City will be delivered or made available to the Contractor at the points specified in the special provisions.

The cost of handling and placing all materials after they are delivered to the Contractor shall be considered as included in the contract price for the item in connection with which they are used.

The Contractor will be held responsible for all delivered materials, and deductions will be made from any monies due the Contractor to make good any shortages and deficiencies, from any cause whatsoever, and for any damage which may occur after such delivery, and for any demurrage charges.

## **107. - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC**

<b>107. 01</b>	<b>Laws to be Observed</b>
<b>107. 02</b>	<b>Permits, Licenses and Taxes</b>
<b>107. 03</b>	<b>Patented Devices, Materials and Processes</b>
<b>107. 04</b>	<b>Restoration of Surfaces Opened by Permit</b>
<b>107. 05</b>	<b>Federal Aid Provisions</b>
<b>107. 06</b>	<b>Sanitary Provisions</b>
<b>107. 07</b>	<b>First Aid</b>
<b>107. 08</b>	<b>Public Convenience and Safety</b>
<b>107. 09</b>	<b>Barricades and Warning Signs</b>
<b>107. 10</b>	<b>Maintenance of Traffic</b>
<b>107. 11</b>	<b>Use of Explosives</b>
<b>107. 12</b>	<b>Protection and Restoration of Property</b>
<b>107. 13</b>	<b>Responsibility for Damage Claims</b>
<b>107. 14</b>	<b>Contractor's Responsibility for Work</b>
<b>107. 15</b>	<b>Contractor's Responsibility for Utility Property and Services</b>
<b>107. 16</b>	<b>Furnishing Right-of-Way</b>
<b>107. 17</b>	<b>Personal Liability of Public Officials</b>
<b>107. 18</b>	<b>No Waiver of Legal Rights</b>
<b>107. 19</b>	<b>OSHA</b>

**107.01 Laws to be Observed.** The Contractor shall keep fully informed of all federal, state and local laws, ordinances, and regulations and all orders and decrees of authorities having any jurisdiction or authority, which in any manner affect those engaged or employed in the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the City and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by the Contractor or the Contractor's subcontractor(s), agents or employees.

The Contractor agrees that in the hiring of employees for the performance of work under this contract or any subcontract hereunder, neither the Contractor nor any of the Contractor's subcontractors, nor any person acting on behalf of the Contractor or any of its subcontractors, shall, by reason of race, creed or color, discriminate against any citizen of the United States in the employment of labor or workers, who is qualified and available to perform the work to which the employment relates and that neither the Contractor nor any of the Contractor's subcontractors, nor any of their employees or agents shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed or color.

**107.02 Permits, Licenses and Taxes.** The Contractor shall procure all permits and licenses, pay all charges, fees, and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work.

Prior to the closure of or working in or on any portion of a street the Contractor shall obtain a permit through the Director of Parks & Recreation.

**107.03 Patented Devices, Materials and Processes.** If the Contractor employs any design, device, material, or process covered by letters of patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the patentee or owner. The Contractor and the surety shall indemnify and save harmless the City, any affected third party or political subdivision from any and all claims for infringement by reason of the use of any such patented design, device, material or process or any trademark or copyright, and shall indemnify the City for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the prosecution of or after the completion of the work.

In the case of patented pavements and wearing courses, where royalties, licensing and proprietary service charges, exacted or to be exacted by the patentees, are published and certified agreements are filed with the City, guaranteeing to prospective bidders free unrestricted use of all such proprietary rights and trademarked goods upon payment of such published charges, such patented payments may be specifically designated in the proposal and competition secured upon the item exclusive of the patent or proprietary charges.

**107.04 Restoration of Surfaces Opened by Permit.** The right to construct or reconstruct any utility service in the highway or street or to grant permits for same, at any time, is hereby expressly reserved by the Director of Parks & Recreation, and the Contractor shall not be entitled to any damages either for the digging up of the street or for any delay occasioned thereby.

Any individual, firm, or corporation wishing to make an opening in the street must secure a permit through the Director of Parks & Recreation. The Contractor shall allow parties bearing such permits, and only those parties, to make openings in the street. When ordered by the Director of Parks & Recreation, the Contractor shall make in an acceptable manner all necessary repairs due to such openings and such necessary work will be paid for as extra work, or as provided in these specifications, and will be subject to the same conditions as original work performed.

**107.05 Federal Aid Provisions.** When the United States Government pays all or any portion of the cost of a project, the Federal laws and the rules and regulations made pursuant to such laws must be observed by the Contractor and the work shall be subject to the inspection of the appropriate federal agency.

Such inspection shall in no sense make the federal government a party to this contract and will in no way interfere with the rights of either party hereunder.

**107.06 Sanitary Provisions.** The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees and City representatives as may be necessary to comply with the requirements of the state and local boards of health, or of other authorities having jurisdiction.

**107.07 First Aid.** The Contractor shall provide and keep upon the work a completely equipped first aid kit and shall provide ready access thereto at all times when workers are employed on the work. The Contractor shall designate some proper person or persons to be in charge of administering first aid and shall cause such person or persons to receive proper instructions therein.

**107.08 Public Convenience and Safety.** The Contractor shall at all times so conduct contract work as to assure the least possible obstruction to traffic. The safety and convenience of the general public and the residents along the street and the protection of persons and property shall be provided for by the Contractor as specified under 104. 05.

The Contractor shall provide and maintain safeguards, safety devices and protective equipment and take any other needed actions as may be necessary to protect the public and property in connection with the work.

The presence of barricades or lights, provided and maintained by any party other than the Contractor, shall not relieve the Contractor of this responsibility.

**107.09 Barricades and Warning Signs.** Temporary traffic control devices and facilities shall be furnished, erected, maintained and paid for in accordance with the provisions of 614 of the CMSC (Maintaining Traffic). All traffic control devices shall conform to Part 7 of the OMUTCD for Streets and Highways as amended, as required under Ohio Revised Code Section 4511. 09. The provisions of this item and this section shall not in any way relieve the Contractor of any of the Contractor's legal responsibilities or liabilities, for the safety of the public.

**107.10 Maintenance of Traffic.** All work shall be performed in accordance with 614 of the CMSC, except that unless an item for maintaining traffic is included in this contract, the cost of this work shall be included in the prices bid for the various items of the contract and there will be no separate payment made there for.

To avoid interruption of bus and coach operations, the Contractor shall give sufficient advance notice to the company or companies concerned, to permit rerouting of lines, if necessary, prior to the commencement of work.

When material is piled in the gutters, suitable drains of sufficient size to carry all the storm water flowing in the gutters, shall first be laid. Where the drainage from cross streets or alleys is interfered with or cut off by reason of the nature of the work, suitable crossings shall be provided for pedestrians. No material shall be piled within twenty feet of any fire hydrant.

The Contractor shall notify the appropriate fire department, and the City of Dublin Police Department whenever a street or section of street is about to be closed to traffic and also when it is to be opened.

**107.11 Use of Explosives.** Blasting shall not be permitted. Under certain special conditions, the Director of Parks & Recreation may request blasting. In such cases, the Contractor shall use the highest degree of care and adequate protective measures so as not to endanger life, completed portions of the project, and all other property, both public and private. Before conducting any blasting operations, the Contractor shall furnish the Director of Parks & Recreation, in writing, a schedule of intended blasting operations and the Contractor shall give the Director of Parks & Recreation prior written notification of any changes in such schedule. The Contractor shall provide proof of special hazard insurance as set forth under 103.08.

The use, handling, storage and transportation of explosives shall conform and be in accordance with the applicable requirements and/or provisions of:

- (a) the latest revision of "State of Ohio Administrative Code Chapter 4121:1-3," issued by the Department of Industrial Relations and the Industrial Commission of the State of Ohio;
- (b) the Ohio Explosive Laws, Ohio Revised Code Sections 3743.01 - 3743.26;
- ☐ local regulations; and
- (d) as specified herein.

The Contractor shall secure a written permit from the appropriate fire department before any blasting work is begun.

Except in the case of continuous tunnel operations, all blasting shall be conducted during daylight hours only with the provision that when required by the Director of Parks & Recreation, blasting shall be limited to certain daylight hours. All firing shall be done by electrical means or any suitable, manufactured, non-electric blasting system which allows the blaster to control the exact moment in which firing of the shot will occur. The Contractor shall make suitable provisions to prevent the scattering of broken rock, earth, stones or other material during blasting operations.

**107.12 Protection and Restoration of Property.** The Contractor shall be responsible for the preservation of all public and private property.

The Contractor shall be responsible for all damage or injury to property during the prosecution of the work, resulting from any act omission, neglect, or misconduct in any manner or method of executing the work, or at any time due to defective work or materials.

Dust, mud, noise or other nuisance originating from any plant operations either inside or outside the right-of-way shall be controlled by the Contractor in accordance with local ordinances and regulations at the sole expense of the Contractor.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work; or in consequence of the non-execution thereof by the Contractor, the Contractor shall restore such property to a condition similar or equal to that existing before such damage or injury was done by repairing, rebuilding or otherwise restoring as may be directed by the Director of Parks & Recreation, or shall make good such damage or injury in an acceptable manner. The cost of all work associated with said restoration shall be at no additional cost to the City.

The Contractor shall cooperate with the Director of Parks & Recreation in protecting and preserving cornerstones and monuments that may be within the right-of-way. The Contractor shall not start grading or resurfacing operations until the Director of Parks & Recreation has referenced all known cornerstones, monuments and land-markers in the area to be improved. Monuments, cornerstones and land-markers unexpectedly encountered shall be protected, referenced and preserved in the same manner.

When cornerstones, monuments and land-markers are encountered in the performance of the work, and monument covers are not listed in the proposal, the City will furnish them and supervise their precise location and installation, and the Contractor will furnish all the labor, tools and other materials required incidental to such installations. Any labor, tools and materials so furnished shall be paid for as force account work.

The cost to the City for repair, re-evaluation of location and replacement of any cornerstone, monument or land-marker within the project, damaged, destroyed, or made inaccessible during the progress of the work by the Contractor or the Contractor's employees, in violation of these provisions, is a charge deductible from any estimate payable on account of the work.

**107.13 Responsibility for Damage Claims.** The Contractor and the surety shall save harmless the City and all of its representatives, or any participating railroad or railway company, from all suits, actions, or claims of any character brought on account of any injuries or damages sustained by any person or property in consequence of any neglect in safeguarding the work or through the use of unacceptable materials in the construction of the improvement or on account of any act or omission, by the Contractor, or its agents. The Contractor or the Surety shall pay any judgment obtained or growing out of any such claims or suits.

**107.14 Contractor's Responsibility for Work.** Until final written acceptance of the project by the Director of Parks & Recreation, the Contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements, from vandalism, from vehicular accidents, or from any other cause, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by

any of the above causes before final acceptance and shall bear the expense thereof except damage to the work due to unforeseeable causes beyond the control of and without the fault or negligence of the Contractor, including but not restricted to acts of God, of the public enemy or governmental authorities.

In case of suspension of work by the Contractor, or under the provisions of 105.09, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project, provide for adequate drainage and shall erect any necessary temporary structures, signs, or other facilities at the Contractor's expense. During such period of suspension of work, the Contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seeding, and sodding furnished under the contract, and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

**107.15 Contractor's Responsibility for Utility Property and Services.** At points where the Contractor's operations are adjacent to properties of railway, telegraph, telephone, and power companies, or are adjacent to other utilities or property, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The Contractor shall cooperate with the owners of any underground or overhead utility lines in their protection and in removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

In the event of interruption to water or utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. If water or sewer service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the appropriate fire department.

**107.16 Furnishing Right-of-Way.** The City will be responsible for the securing of all necessary rights-of-way in advance of construction deemed necessary by the City. Any exceptions will be indicated in the contract.

**107.17 Personal Liability of Public Officials.** In carrying out any of the provisions of the specifications, or in exercising any power or authority granted to them by or within the scope of the contract, there shall be no liability upon the City Manager, the Director of Parks & Recreation, or their authorized representatives, either personally or as officials of the City, it being understood that in all such matters they act solely as agents and representatives of the City.

**107.18 No Waiver of Legal Rights.** Neither the inspection by the Director of Parks & Recreation, nor by any inspector or duly authorized City representatives nor any order, measurements, or certificate by the Director of Parks & Recreation, or said representatives, nor any order by the Director of Parks & Recreation, for the payments of money, nor any payment for, nor acceptance of any work by the Director of Parks & Recreation, nor any extension of time, nor any possession taken by the City or its duly authorized representatives, shall operate as a waiver of any provision of this contract, or of any power herein reserved to the City, or any right to damages herein provided; nor shall any waiver of any breach of this contract be held to be a waiver of any other subsequent breach.

**107.19 OSHA.** All Contractors shall comply with the provisions of the Occupational Safety and Health Act of 1972 and all amendments thereto.

## **108. - PROSECUTION AND PROGRESS**

- 108. 01            Subletting of Contract**
- 108. 02            Prosecution and Progress**
- 108. 03            Suspension of Work**
- 108. 04            Limitation of Operations**
- 108. 05            Character of Workers, Methods, and Equipment**
- 108. 06            Date for Completion**
- 108. 07            Liquidated Damages**
- 108. 08            Cancellation of Contract**
- 108. 09            Certified Payroll**

**108.01 Subletting of Contract.** The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or contracts or any portion thereof, or of its right, title, or interest therein, without written consent of the Director of Parks & Recreation. In case such consent is given, the Contractor will be permitted to subcontract a portion thereof, but shall perform with the Contractor's own organization, work amounting to not less than fifty percent of the total contract cost, except that any items set forth in the proposal to be "specialty items" may be performed by subcontract and the cost of any such specialty items so performed by subcontract may be deducted from the total cost before computing the amount of work required to be performed by the Contractor's own organization. No subcontract, or transfer of contract, shall in any case release the Contractor of liability under the contract and bonds.

**108.02 Prosecution and Progress.** The Contractor shall submit a progress schedule on an approved form within ten days after the Notice to Proceed has been issued showing how the Contractor proposes to prosecute the work. If the Contractor's operations are materially affected by changes in the plan or in the amount of the work or if the Contractor has failed to comply with the approved schedule, the Contractor shall submit a revised progress schedule, if requested by the Director of Parks & Recreation, which schedule shall show how the Contractor proposes to prosecute the balance of the work. The Contractor shall submit the revised progress schedule within ten days after the date of the request. The Contractor shall

incorporate into every progress schedule submitted, any contract requirements regarding the order of performance of portions of the work. The Contractor shall use all practicable means to make the progress of the work conform to that shown on the progress schedule which is in effect. Acceptance by the City of the revised progress schedule shall not serve as a time extension approval. Any extension of the contract completion date must be processed per 108.06. No payment will be made to the Contractor while the Contractor is delinquent in the submission of a progress schedule. Should the prosecution of the work, for any reason, be discontinued, the Contractor shall notify the Director of Parks & Recreation at least one working day in advance of resuming operations. No payment will be made to the Contractor if the Contractor is delinquent in the submission of a progress schedule. Should the prosecution of the work, for any reason, be discontinued, the Contractor shall notify the Director of Parks & Recreation at least two working days in advance of resuming operations.

On contracts which are complicated and interdependent in nature, a Critical Path Method type progress diagram may be required by the special provisions to the contract.

Progress schedules and diagrams are to be included in unit price bids of the various contract items, unless a specific bid item is included in the contract.

**108.03 Suspension of Work.** The Director of Parks & Recreation may instruct the Contractor to delay the start of operations or suspend the Contractor's operations in whole or in part, for the length of time the Director of Parks & Recreation may deem necessary. The Contractor shall start or resume the operations when notified to do so by the Director of Parks & Recreation.

If, without the fault or negligence of the Contractor, the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Director of Parks & Recreation in the administration of the contract or by failure to act within the time specified in the contract (or if no time is specified within a reasonable time), an adjustment shall be made by the Director of Parks & Recreation for any increase in the cost of performance of the contract (excluding profit) necessarily caused by the unreasonable period of such suspension, delay, or interruption, and the contract shall be modified in writing.

If construction under these specifications is suspended, delayed, or interrupted through no fault of the Contractor by an order of a court of competent jurisdiction or the Environmental Protection Agency, such suspension, delay, or interruption will be considered to be an unreasonable suspension, delay, or interruption.

In the event that additional expense or loss due to suspension includes machinery or equipment idled by such act or failure to act, payment therefore may be allowed only for machinery or equipment actually on the project site required for those phases of the construction work to which such order applies, and such payment shall be made at the following rates: for idled machinery or equipment owned by the Contractor, fifty percent of the rental price; and for idled machinery or equipment rented by the Contractor, the actual rental price paid

plus fifteen percent thereof. The maximum rental price shall be as set forth in the current Equipment Guide Blue Book.

**108.04 Limitation of Operations.** The Contractor shall conduct the work at all times in such a manner and in such sequence as will assure the least interference with traffic and other operations of the public. The Contractor shall have due regard to the location of detours and to the provisions for handling traffic. The Contractor shall not open up work to the prejudice or detriment of work already started. The Director of Parks & Recreation may require the Contractor to finish a section on which work is in progress before work is started on any additional sections if the opening of such section is essential to public convenience.

**108.05 Character of Workers, Methods, and Equipment.** The Contractor shall at all times employ sufficient competent labor and equipment for prosecuting the several classes of work to full completion in the manner and time required by these specifications.

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

Any person employed by the Contractor or by any subcontractor who, in the opinion of the Director of Parks & Recreation, does not perform their work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Director of Parks & Recreation, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the work without the approval of the Director of Parks & Recreation. Should the Contractor fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the work, the Director of Parks & Recreation may withhold all estimates, which are or may become due, or may suspend the work by written notice until the Contractor complies with such orders.

All equipment which is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet the requirements of the work and produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other streets or highways will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the contract, the Contractor is free to use any methods or equipment that is demonstrated to the satisfaction of the Director of Parks & Recreation will accomplish the contract work in conformity with the requirements of the contract.

When the contract specifies that the construction be performed by the use of certain methods and equipment, such methods and equipment shall be used unless others are authorized by the Director of Parks & Recreation. If the Contractor desires to use a method or type of equipment other than those specified in the contract, the Contractor may request authorization from the

Director of Parks & Recreation to do so. The request shall be in writing and shall include a full description of the methods and equipment proposed to be used and an explanation of the reasons for desiring to make the change. If approval is given, it will be on the condition that the Contractor will be fully responsible for producing construction work in conformity with contract requirements. If, after trial use of the substituted methods of equipment, the Director of Parks & Recreation determines that the work produced does not meet the contract requirements, the Contractor shall discontinue the use of the substitute methods or equipment and shall complete the remaining construction with the specified methods and equipment. The Contractor shall remove the deficient work and replace it with work of specified quality at no expense to the City, or take such other corrective action as directed by the Director of Parks & Recreation. No change will be made in basis of payment for the construction items involved nor in contract time as a result of authorizing a change in methods or equipment under these provisions.

**108.06 Date for Completion.** The Contractor shall have completed the work on or before the calendar date specified in the contract or on or before a later date determined as specified herein, otherwise the Director of Parks & Recreation shall proceed as provided in 108. 07 or 108. 08.

If the contract is revised in any material respect and it is determined that said revision will cause delay in the completion of the work, the Director of Parks & Recreation will postpone the completion date by the number of calendar days determined to be equitable. If the Contractor finds it impossible for reasons beyond the Contractor's control to complete the work by the date as specified or as extended in accordance with the provisions of this section, the Contractor at any time prior to the expiration of the contract time as extended, may make a written request to the Director of Parks & Recreation for an extension of time setting forth therein the reasons which will justify the granting of the Contractor's request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Director of Parks & Recreation finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, then an extension of the time for completion in such amount as the conditions justify may be granted.

The extended time for completion shall then be in full force and effect the same as though it were the original time for completion.

If the Director of Parks & Recreation should suspend the work in whole or in part as provided in 108. 03, the date for completion shall be postponed the number of days that the suspension directly or indirectly delays the completion of the work.

**108.07 Liquidated Damages.** For each calendar day that any work shall remain uncompleted after the contract completion date, the sum specified herein will be deducted from any money due the Contractor, not as a penalty but as liquidated damages; provided however, that due account shall be taken of any adjustment of the completion date granted under the provisions

of 108. 06. If the proposal contains a special provision for liquidated damages it shall be used in lieu of the schedule contained herein.

The Contractor shall complete the work by the calendar date specified in the contract, or by a later date determined in accordance with 108. 06. Requests for extension of the completion date shall be in writing and shall be submitted to the Director of Parks & Recreation, prior to the calendar date set for completion in the proposal. Failure to request an extension of the completion date, in writing, prior to the calendar date set for completion in the proposal and/or per 108. 06, will AUTOMATICALLY cause the deduction of liquidated damages, as set forth in 108. 07 or the proposal, from all estimates due and payable to the Contractor after such completion date.

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

The Director of Parks & Recreation may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use.

In addition to the amounts specified hereinafter for each calendar day after the completion date, the Contractor will be charged for all inspection services regardless of any extension of time granted, unless such charges are waived by the Director of Parks & Recreation.

#### SCHEDULE OF LIQUIDATED DAMAGES

Original Contract Amount (Total Amount of the Bid)		Amount of Liquidated Damages to be Deducted for Each Calendar Day of Overrun in Time
From More Than	To and Including	
\$ 0	\$ 25,000	\$ 100. 00
25,001	50,000	150. 00
50,001	100,000	200. 00
100,001	500,000	300. 00
500,001	1,000,000	500. 00
1,000,001	2,000,000	750. 00
2,000,001	5,000,000	1,000. 00
5,000,001	10,000,000	1,500. 00

Over \$10,000,001	2,000. 00
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**108.08 Certified Payroll.** The Contractor shall submit to the Prevailing Wage Coordinator of the City a weekly copy of all project employee payrolls for the duration of the time of construction. The copy shall be accompanied by a certified statement, signed by the Contractor or an agent of the Contractor, indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the prevailing wage rates in the contract, or any subsequent revision of wage rates during the life of the contract. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

The Contractor shall make employment records available for inspection by authorized representatives of the City and will permit employees to be interviewed during working hours by these representatives.

All weekly payrolls shall contain or have attached the following:

- 1) the name and employer identification number of each employee;
- 2) the current address of the employee;
- 3) the job classification of the employee (same as shown on wage determination or provisional approval);
- 4) rate of pay;
- 5) hours worked each day and total for each week;
- 6) fringe payments and deductions made.

Failure to furnish and submit the above information as part of the required weekly Certified Payroll will be cause for the City to withhold the preparation of the monthly estimate. In the event of a violation of the wage rate provisions by the Contractor or any subcontractor, the City may, after notice to the Contractor, suspend further payments or proceed to terminate the contract as provided by other sections of the contract.

## **109. - ACCEPTANCE, MEASUREMENT AND PAYMENT**

<b>109. 01</b>	<b>Measurement of Quantities</b>
<b>109. 02</b>	<b>Scope of Payment</b>
<b>109. 03</b>	<b>Compensation for Altered Quantities</b>
<b>109. 04</b>	<b>Extra and Force Account Work</b>
<b>109. 05</b>	<b>Eliminated Items</b>
<b>109. 06</b>	<b>Partial Payments</b>
<b>109. 07</b>	<b>Payment for Material on Hand</b>
<b>109. 08</b>	<b>Final Inspection and Acceptance</b>
<b>109. 09</b>	<b>Final Estimate</b>
<b>109. 10</b>	<b>Release of Liability</b>
<b>109. 11</b>	<b>Guarantee</b>

**109.01 Measurement of Quantities.** Where work is to be paid for by units of length, area, weight or volume, all work accepted under this contract will be measured by the Director of Parks & Recreation, and the quantities of various items of work performed will be determined by the Director of Parks & Recreation, as the basis for final settlement.

For the calculation of quantities in which the computation of area by geometric methods would be comparatively laborious, it is stipulated and agreed that the planimeter shall be considered an instrument of precision adapted to the measurement of such areas.

**109.02 Scope of Payment.** The Contractor shall receive and accept compensation provided in the contract as full payment for furnishing all materials and equipment for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage, or expense of whatever character arising out of the nature of the work or the prosecution thereof, except as otherwise provided in 104. 02, 105. 22 and 107. 14.

If the "Basis of Payment" clause in the specifications relating to any unit price in the bid schedule requires that the said unit price cover and be considered compensation for certain work or material essential to the item, this same work or material will not also be measured or paid under any other pay item which may appear elsewhere in the specifications.

**109.03 Compensation for Altered Quantities.** When the accepted quantities of work vary from the quantities in the bid schedule, the Contractor shall accept as payment in full, so far as contract items are concerned, payment at the original contract unit prices for the accepted quantities of work done. No allowance except as provided in 104. 02 will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the bidder and subsequent loss of expected reimbursements therefor or from any other cause.

Increased work involving supplemental agreements shall be paid for as stipulated in such agreements. The Contractor shall furnish substantiating data required in the preparation of these agreements. The costs of increased work shall be developed using guidelines of 109. 04.

**109.04 Extra and Force Account Work.** Extra work performed in accordance with the requirements and provisions of 104. 03 will be paid for at the unit prices or lump sum stipulated in the order authorizing the work, or the City may require the Contractor to do such work on a force account basis to be compensated in the following manner:

**(a) Labor.** For all labor and for all foremen in direct charge of the specific operations, the Contractor shall receive the rate of wage and fringe benefits currently in effect at the time the work is performed for each and every hour that said labor and foremen are actually engaged in such work, to which may be added an amount equal to thirty percent of the sum thereof. The term fringe benefits shall be defined as the actual costs paid to, or in behalf of, workers by reason of health and welfare benefits, pension fund benefits or other benefits, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. In addition to the above the Contractor shall receive the actual cost of Social Security Tax, Workers' Compensation and State and Federal Unemployment Insurance. In lieu of itemizing these four items, fifteen percent of the sum of wages and fringe benefits may be added.

The wages of any supervisor or timekeeper who is employed partly on force account work and partly in other work, shall be prorated between the two classes of work according to the number of men employed on each class of work as shown by the payrolls.

The Contractor shall receive the actual costs paid for subsistence and travel allowances when such payments are required by collectible bargaining agreement or other employment contract generally applicable to the classes of labor employed on the work. No percentage may be added to these costs.

**(b) Materials.** For materials accepted by the Director of Parks & Recreation and used, the Contractor shall receive the actual cost of such materials delivered on the work, including transportation charges paid (exclusive of machinery rentals as hereinafter set forth), to which cost fifteen percent may be added.

**☐ Equipment.** For machinery or special equipment other than small tools which it may be deemed necessary or desirable to use, the Contractor shall be allowed a rental price to be agreed upon in writing before such work is begun, for the time that such equipment is in use on the work. No profit or overhead shall be added to any charges in connection with the use of owned equipment, however fifteen percent of the basic amount payable for rented equipment may be added for overhead and profit. Proper invoices will be required for rental equipment. The maximum rental price shall be as set forth in the current Equipment Guide Blue Book.

**(d) Supervisor's Transportation.** A flat hourly rate, which includes fuel and lubricants, profit and overhead, and any other costs will be allowed for the supervisor's transportation.

**(e) Fuel and Lubricants.** For all equipment except the supervisor's transportation (for which an all inclusive flat rate is allowed) fifteen percent of the basic equipment allowance may be added for cost of fuel and lubricants unless the Blue Book rate includes such fuel and lubricants.

**(f) Subcontract Work.** For work performed by an approved subcontractor the Contractor will be allowed an amount to cover administrative costs, equal to five percent of the compensation provided in (a), (b) (c), (d), and (e) but not exceeding \$5,000. 00.

**(g) Compensation.** The compensation to the Contractor as above provided in (a), (b), (c), (d), (e) and (f) shall constitute payment in full for extra work done on a force account including administrative, superintendence, overhead, use of tools and equipment for which no rental is allowed, profit, taxes other than sales tax, premium on insurance, and any other expense incidental to performing the force account work. Sales tax will not be allowed on any item for which tax exemption may be obtained.

**(h) Statements.** Final payment will not be made for work performed on a force account basis until the Contractor has furnished the Director of Parks & Recreation with quadruplicate itemized statements of the cost of such force account work detailed as follows:

- (1) Name, classification, date, daily hours, total hours, rate, and extension for each laborer and supervisor.
- (2) Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.
- (3) Quantities of materials, prices, and extensions.
- (4) Transportation of materials.

The Contractor's representative and the Director of Parks & Recreation shall compare records daily of the cost of work done as ordered on a force account basis. The Director of Parks & Recreation shall certify that these records are correct.

Statements shall be accompanied and supported by proper invoices for all materials used, transportation charges, and rented equipment performing work on force account operations. However, if materials used on the force account work are not specifically purchased for such work, but are produced by the Contractor or taken from the Contractor's stock, then in lieu of the invoices the Contractor shall furnish an affidavit certifying that such materials were produced by or taken from the Contractor's stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor. Statements shall be filed not later than the twentieth day of the month following that in which the work was actually performed.

The above described force account provisions will also apply to work performed at agreed unit prices and agreed lump sums when the agreed prices are based on analyses of cost of labor, material and equipment.

**109.05 Eliminated Items.** Should any items contained in the proposal be found unnecessary for the proper completion of the work, the Director of Parks & Recreation may, upon written order to the Contractor, eliminate such items from the contract, and such action shall in no way invalidate the contract. When the Contractor is notified of the elimination of items, the Contractor will be reimbursed for actual work done and all costs incurred, including mobilization of materials prior to said notification.

**109.06 Partial Payments.** Included in contract language

**109.07 Payment for Material on Hand.** Included in contract language

**109.08 Final Inspection and Acceptance.** Included in contract language

**109.09 Final Estimate.** Included in contract language

**109.10 Release of Liability.** No person or corporation other than the signer of this contract as Contractor, has any interest hereunder and no claim shall be made or be valid, and neither the City, nor any official or agent thereof, shall be liable for or be held to pay any money except as provided herein. The acceptance by the Contractor of payment shall operate as and shall be a release to the City, and every officer and agent thereof, from all claims and liability to the Contractor for anything done or furnished for, or relating to the work, or for any act or neglect of the City, or of any person relating to or affecting the work.

**109.11 Guarantee.** When any work is accepted by the City there shall be a guarantee period extending for one year from the date of acceptance of the work. The City will designate on the plans or in the proposal those portions of the project which may be accepted prior to completion of the entire project. If during the course of the construction, the City desires to accept and place in operation any additional portions of the work, written notification will be given to the Contractor by the City.

At any time during the guarantee period, the City may notify the Contractor and his surety that certain repairs are necessary. Within ten days after being so notified, the Contractor shall make such repairs as are declared necessary to restore the work to a good and serviceable condition. Specifications for the work performed under this contract shall govern in the making of repairs under this section. In the event that the Contractor fails to comply with the order to repair as provided, said repairs may be made by the City and it is hereby agreed by the Contractor that reimbursement shall be made to the City for said expense so incurred within ten days following the receipt of a statement rendered to the Contractor by the City for said expense. Further, the Contractor will receive no recognition as a bidder for any future work of the City for a period of three years.

If the cost of providing security to the City for the one year guarantee period is prohibitive, the Contractor may, with approval of the Director of Parks & Recreation, make an assignment of bonds or other form of acceptable security to the City in the amount of five percent of the contract cost for the duration of the guarantee period.

**PAYROLL INFORMATION**

I, \_\_\_\_\_ (Name),  
\_\_\_\_\_ (Title) of \_\_\_\_\_  
(Subcontractor/Contractor), state the following:

1. That I pay or supervise the payment of the persons employed by \_\_\_\_\_ (Subcontractor/Contractor) on the above-referenced project.
  
2. That during the payroll period commencing on the \_\_\_\_ day of \_\_\_\_\_, 2016, and ending on the \_\_\_\_ day of \_\_\_\_\_, 2016, all persons employed on said project have been paid the full weekly wages earned; that no rebates have been or will be made either directly or indirectly to or on behalf of said \_\_\_\_\_ (Contractor/Subcontractor) from the full weekly wages earned by such persons; and that no deductions have been made either directly or indirectly from the full wages earned by such persons, other than permissible deductions as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:  
  
\_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_
  
3. That any payrolls otherwise under this Agreement for Construction (the "Agreement") required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in the specifications as supplied by the Department of Industrial Relations or any wage determination incorporated into the Agreement; and that the classifications set forth therein for each laborer or mechanic conform with the work he performed.
  
4. That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with the Ohio Apprenticeship Council.

5. That (check applicable box):

a. WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS:

In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above-referenced payroll, payments of fringe benefits listed in the Agreement have been or will be made to appropriate programs for the benefit of such employees, except as noted in Section 4 below.

b. WHERE FRINGE BENEFITS ARE PAID IN CASH:

Each laborer or mechanic listed in the above-referenced payroll has been paid as indicated on the payroll, and amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the Agreement, except as noted in Section 4 below.

c. Exceptions:

Exception (Craft):

Explanation:

_____	_____
_____	_____
_____	_____
_____	_____

Remarks:

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

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Print Name and Title)

The willful falsification of any of the above statements may subject the Contractor or Subcontractor to fines as described in Section 4115.99 of the Ohio Revised Code.

**FINAL PAYROLL AFFIDAVIT**

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_, SS:

I, \_\_\_\_\_ (Affiant),  
\_\_\_\_\_ (Title) of \_\_\_\_\_  
(Contractor/Subcontractor), do hereby certify that:

1. The Payroll Information reports submitted on behalf of (Contractor/Subcontractor) for this project are correct.
2. The wages paid to all employees for the full number of hours worked in connection with the Agreement for Construction (the "Agreement") for the above-referenced project during the period from \_\_\_\_\_ to \_\_\_\_\_ is in accordance with the prevailing wages prescribed by the Agreement.
3. No rebates or deductions for any wages due any person have been directly or indirectly made other than those provided by law.

\_\_\_\_\_  
(Signature of Affiant)

\_\_\_\_\_  
(Print Name)

Sworn to and subscribed in my presence this \_\_\_ day of \_\_\_\_\_, 2016.

\_\_\_\_\_  
Notary Public

The above affidavit must be executed and sworn to by the officer or agent or the Contractor/Subcontractor who supervised the payment of employees, before the City of Dublin, Ohio will release the surety and/or make final payment due under the terms of the Agreement.

**SECTION 5  
SPECIFICATIONS**

**City of Dublin  
Holder Wright Park  
November 2016**

**PROJECT SPECIFICATIONS**

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<b><u>Section</u></b>	<b><u>Title</u></b>
017000	Project Close-Out
033000	Cast-in-Place Concrete
033300	Architectural Concrete
042200	Concrete Unit Masonry
044313.16	Adhered Stone Masonry Veneer
047200	Cast Stone Masonry
061000	Rough Carpentry
071416	Cold Fluid-Applied Waterproofing
075423	Thermoplastic Polyolefin (TPO) Roofing
079200	Joint Sealants
081113	Hollow Metal Doors and Frames
086250	Tubular Daylighting Devices
087111	Door Hardware (Descriptive Specification)
102113	Toilet Compartments
102800	Toilet, Bath, and Laundry Accessories
329200	Turf and Grasses
329700	Vegetated Roof Assemblies
n/a	Timber Bridge Specifications, 85 PSF Pedestrian Bridge

## **SECTION 01 7000 - PROJECT CLOSE-OUT**

### **PART 1 - GENERAL**

#### **1.1 Section Includes**

- A. This Section specifies administrative and procedural requirements for project close-out, including but not limited to:
  - 1. Inspection procedures for Substantial Completion and Final Completion.
  - 2. Project record document submittal.
  - 3. Operating and maintenance manual submittal.
  - 4. Submittal of warranties.
  - 5. Final cleaning.
  - 6. Close-out requirements for specific construction activities are included in the appropriate Sections in Division 3 through 26.

#### **1.2 Substantial Completion**

- A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, Subcontractor shall complete the following. List all exceptions in the request.
  - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
    - a. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
  - 2. Advise General Contractor of pending insurance change-over requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
  - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.
  - 5. Submit record drawings, maintenance manuals, and similar final record information.
  - 6. Deliver tools, spare parts, extra stock, and similar items.
  - 7. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
  - 8. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: On receipt of a request for inspection, Architect, General Contractor and Representatives from Owner will either proceed with inspection or advise Subcontractor of unfilled requirements. General Contractor will prepare the Certificate of Substantial Completion following inspection, or advise

Subcontractor of construction that must be completed or corrected before the certificate will be issued.

1. When Subcontractor believes the Work is Substantially Complete, he shall notify the General Contractor in writing and accompany the letter with his Punch List of items to be completed and corrected before final completion. General Contractor will verify this list and then schedule with Architect and Subcontractor for inspection.
2. Architect and Consulting Engineers will observe Work, verify Substantial Completion has been reached, and verify Subcontractor's Punch List or amend it. Verified or amended Punch List will be attached to Certificate of Substantial Completion.
3. If, in Architect and General Contractor's judgment, project cannot be considered Substantially Complete, he shall notify subcontractor of items to be completed or corrected before Certificate of Substantial Completion can be issued.
4. If subcontractor's Punch List is inadequate and an excessive number of items remain to be completed or corrected, the Work will not be considered Substantially Complete and the review terminated.
  - a. Architect and Consulting Engineers will make only two inspections to determine Substantial Completion. If the Work is not Substantially Complete, successive inspections required will be back charged to subcontractor at the Architect's and Consulting Engineer's current billing rate, including mileage and travel time.
  - b. Payment to subcontractor may be withheld from subcontractor's remaining payment due to compensate for this cost.
5. Results of the completed inspection will form the basis of requirements for final acceptance.

### **1.3 Final Acceptance**

- A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, Subcontractor shall complete the following. List all exceptions in the request.
  1. Submit final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
  2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
  3. Submit a certified copy of Architect's final inspection list of items to be completed or corrected, stating each item has been completed or otherwise resolved for acceptance, and list has been endorsed and dated by Architect and General Contractor.
- B. Re-inspection Procedure: Architect and General Contractor will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to Architect and General Contractor.

1. Upon completion of re-inspection, Architect will prepare a certificate of final acceptance or advise Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. Architect and Consulting Engineers will make only one inspection to determine final completion. If Work is not finally complete, successive inspections required shall be back charged to subcontractor at Architect's and Consulting Engineer's Current billing rate, including mileage and travel time.
  - a. Payment to subcontractor may be withheld from subcontractor's remaining payment due to compensate for this cost.

#### **1.4 Record Document Submittals**

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect's and Owner's reference during normal working hours.
- B. Record Drawings: Subcontractor shall maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark set to show actual installation where installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
  1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
  2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
  3. Note related Change Order numbers where applicable.
  4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
  5. Digital submission of documents to be delivered to owner of all Record Drawings prior to Final Acceptance.
- C. Record Specifications: Subcontractor shall maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with specification text and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot be readily discerned later by direct observation. Note related record drawing information and Product Data.
  1. Upon completion of the Work, submit record Specifications to the Architect for transmittal to the Owner's records.
- D. Maintenance Manuals: Subcontractor shall organize five (5) sets of operating and maintenance data into suitable sets of manageable size. Bind properly

indexed data in an individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn around" cycles.
6. Inspection procedures.
7. Shop drawings and Product Data.
8. Fixture lamping schedule.

E. Warranty Manual:

1. In a separate but similar binder to the Maintenance Manual, each Subcontractor shall include five (5) sets of all required guarantees, warranties, and maintenance contracts for items as they exist in a form that is transferable from Owner to Tenant. Statements of warranty shall be jointly signed by manufacturer, installer, and Contractor and shall identify the Project by name, commission number, and address. In addition, indicate duration and expiration of each warranty and guarantee. All warranties shall be assignable.

F. Other Items: Include updated list of Suppliers and Subcontractors.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 Close-out Procedures**

A. Substantial Completion

1. When the Contractor considers the work substantially complete, he shall submit to the Architect/Owner's Representative:
  - a. A written notice that the work or designated portion thereof is substantially complete.
  - b. A list of items remaining to be completed or corrected.
2. Within a reasonable time after receipt of such notice, the Architect, Owner's Representative and the Contractor will make an inspection to determine the status of completion.
3. When the Architect, Owner's Representative and Contractor have concurred that the work is substantially complete, the following documents will be completed by the Contractor and submitted to the Owner's Representative and Architect simultaneously:
  - a. Certificate of Substantial Completion on AIA Form G-704.
  - b. Punch-list of items remaining to be completed or corrected.
  - c. Contractor shall complete all punch list items within 15 days.

B. Final Inspection

1. When Contractor considers work to be complete, he will submit written certification to the Architect and Owner's Representative verifying that:
  - a. Work has been completed and inspected in accordance with the Contract Documents.
  - b. Equipment and systems have been tested in the presence of the Owner's Representative and are operational.
  - c. Contractor to arrange for a Final Inspection.
2. After receipt of written Certification, the Architect and Owner's Representative will make an inspection to verify the status of completion of the punch list items.
3. Should the Architect and Owner's Representative determine that the work is incomplete or defective:
  - a. Architect and Owner's Representative will promptly notify Contractor, in writing, listing the incomplete or defective work.
  - b. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second Certification to the Architect and Owner's Representative that the Work is complete.
  - c. The Architect and Owner's Representative will re-inspect the Work.
4. When the Architect and Owner's Representative find that the work is acceptable under the Contract Documents, he shall request the Contractor to make Close-out Submittals.

C. Contractor's Close-out Submittals to Architect and Owner's Representative

1. Contractor must submit to Architect and Owner's Representative evidence of compliance with requirements of governing authorities.
  - a. Certificate of Occupancy
  - b. Certificate of Inspections
    1. Mechanical
    2. Plumbing
    3. Electrical
    4. Fire Marshall
    5. Building
2. Contractor must submit to Architect and Owner's Representative all Project Record Documents to the requirements of each respective section in this Project Manual, i.e.: Schedules, Operating and Maintenance Data, Warranties and Bonds, Keys and Keying Schedule, Evidence of Payment and Release of Liens, Certificates of Insurance, etc.

D. Final Application for Payment

1. Before final payment can be released to the Contractor and subsequently to the Subcontractors, the Contractor shall submit to the Owner's Representative all items as listed on the attached "Project Close-out Checklist". Subcontractor shall submit same to the Contractor in the quantity identified.

2. Contractor shall submit to Owner's Representative, along with items as listed on "Project Close-out Checklist", the Final Statement of Accounting on AIA Form G702.

### **3.2 Final Cleaning**

- A. General: General cleaning during construction is required by the General Conditions and included in Section 01500, Temporary Facilities.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  1. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
    - a. Remove labels that are not permanent labels.
  2. General Contractor:
    - a. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Leave concrete floors broom clean.
    - b. Clean the site of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are not paved or planted, to a smooth even-textured surface.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.
  1. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

**END OF SECTION**

## **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. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Footings.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Building walls.
- B. Related Sections:
  - 1. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
  - 2. See site plans and associated ODOT specifications for drainage fill under 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 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.

- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
  - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - 1. Location of construction joints is subject to approval of the Architect.

### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer, manufacturer, and testing agencies.
- B. 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. Curing compounds.
  - 7. Floor and slab treatments.
  - 8. Vapor retarders.
  - 9. Semirigid joint filler.
  - 10. Repair materials.
- C. 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.

### **1.6 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.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 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 single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specifications 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.
- G. Preinstallation Conference: Conduct conference at Project site.
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
    - e. Special concrete finish subcontractor.
  2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor retarder installation, steel reinforcement installation, floor and

slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

## **PART 2 - PRODUCTS**

### **2.1 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.
- 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. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. 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 internally disconnecting units that will leave no corrodible metal closer than 1-1/2 inches to the plane of exposed concrete surface.
  - 2. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

### **2.2 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

### **2.3 REINFORCEMENT ACCESSORIES**

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar

supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

## **2.4 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 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 inch (25 mm) nominal.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M and potable.

## **2.5 ADMIXTURES**

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- C. Color Pigment: Comply with Section 033300 "Architectural Concrete".

**2.6 FIBER REINFORCEMENT**

- A. Synthetic Macro-Fiber: Polypropylene or polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1 to 2-1/4 inches (25 to 57 mm) long.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. 3M; Scotchcast Polyolefin Fibers 1" or 2".
    - b. Euclid Chemical Company (The), an RPM company; Tuf-Strand SF.
    - c. FORTA Corporation; FORTA FERRO.
    - d. Grace Construction Products, W. R. Grace & Co.; Strux 90/40.
    - e. Nycon, Inc.; XL.
    - f. Proplex Concrete Systems Corp.; Fibermesh 650.
    - g. Sika Corporation; Sika Fiber MS or MS10.

**2.7 VAPOR RETARDERS**

- A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

**2.8 CURING MATERIALS**

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals - Building Systems; Kure 1315.
    - b. ChemMasters; Polyseal WB.
    - c. Conspec by Dayton Superior; Sealcure 1315 WB.
    - d. Edoco by Dayton Superior; Cureseal 1315 WB.
    - e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
    - f. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
    - g. Lambert Corporation; UV Safe Seal.
    - h. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
    - i. Meadows, W. R., Inc.; Vocomp-30.

- j. Metalcrete Industries; Metcure 30.
- k. Right Pointe; Right Sheen WB30.
- l. Symons by Dayton Superior; Cure & Seal 31 Percent E.
- m. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

## **2.9 RELATED MATERIALS**

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Reglets: Fabricate reglets of not less than 0.022-inch-(0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

## **2.10 REPAIR MATERIALS**

- A. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface 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 (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## **2.11 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: 25 percent.
  - 2. Combined Fly Ash and Pozzolan: 25 percent.
  - 3. Ground Granulated Blast-Furnace Slag: 25 percent.

4. Portland cement shall be no less than 75 percent of cementitious materials.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing, 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.
- E. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup. Comply with Section 033300 "Architectural Concrete".

## **2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS**

- A. Footings: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.45.
  3. Slump Limit: 4 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
- B. Foundation and Building Walls: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
  2. Maximum Water-Cementitious Materials Ratio: 0.50.
  3. Slump Limit: 4 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
  4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
  2. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m).
  3. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm).
  4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.

5. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 4.0 lb/cu. yd. (2.4 kg/cu. m).

## **2.13 FABRICATING REINFORCEMENT**

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## **2.14 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
  1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), 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 347 as abrupt or gradual, as follows:
  1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces.
  2. Class C, 1/2 inch (13 mm) 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 reglets to receive flashings in outer face of concrete frame at exterior walls where shown.

### **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 (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved 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 SHORES AND RESHORES**

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.
  - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

### **3.5 VAPOR RETARDERS**

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

### **3.6 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.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### **3.7 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 (38 mm) into concrete.
  3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-(3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

### **3.8 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. 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 (150 mm) 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.
- D. 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.
- E. 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 (4.4 deg C) 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.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### **3.9 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, and not receiving a textured form liner finish as specified in Section 033300 "Architectural Concrete".
- C. 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.

### **3.10 FINISHING FLOORS AND SLABS**

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to all slab surfaces.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to all slab surfaces exposed to view.
  - 2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.-(3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).

### **3.11 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. 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.

### **3.12 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 (1 kg/sq. m 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 (300-mm) 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 (300 mm), 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.
  - 3. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.13 JOINT FILLING**

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
  - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

**3.14 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 (1.18-mm) 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 (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) 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 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 (6 mm) 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.
  - 4. Repair defective areas, except random cracks and single holes 1 inch (25 mm) 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 (19-mm) 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.

5. Repair random cracks and single holes 1 inch (25 mm) 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.

### **3.15 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  1. Steel reinforcement placement.
  2. Verification of use of required design mixture.
  3. Concrete placement, including conveying and depositing.
  4. Curing procedures and maintenance of curing temperature.
  5. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. 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. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
  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. 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 (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M.
  - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
6. 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.
7. 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.
8. 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 (3.4 MPa).
9. 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.
10. 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.
11. 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.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

**END OF SECTION 033000**

## **SECTION 033300 - ARCHITECTURAL 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. Section includes cast-in-place architectural concrete including form facings and integrally colored concrete materials.
- B. Related Requirements:
  - 1. Section 033000 "Cast in Place Concrete" for general requirements including reinforcement, accessories, concrete materials, concrete mixture design, placement procedures, and non-architectural concrete finishes.
  - 2. Section 079200 "Joint Sealants" for elastomeric joint sealants in contraction and other joints in cast-in-place architectural concrete.

#### **1.3 DEFINITIONS**

- A. Cast-in-Place Architectural Concrete: Formed concrete that is exposed to view on surfaces of completed structure or building and that requires special concrete materials, formwork, placement, or finishes to obtain specified architectural appearance.
- B. Design Reference Sample: Sample designated by Architect in the Contract Documents that reflects acceptable surface quality and appearance of cast-in-place architectural concrete.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place architectural concrete to attend, including the following:
    - a. Contractor's superintendent.

- b. Independent testing agency responsible for concrete design mixtures.
  - c. Ready-mix concrete manufacturer.
  - d. Cast-in-place architectural concrete subcontractor.
2. Review concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction joints, forms and form-removal limitations, and protection of cast-in-place architectural concrete.

## **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- 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. Formwork Shop Drawings: Show formwork construction including form-facing joints, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect cast-in-place architectural concrete.
- D. Placement Schedule: Submit concrete placement schedule before start of placement operations. Include locations of all joints including construction joints.
- E. Samples: For each of the following materials:
  1. Form liners.
- F. Samples for Verification: Architectural concrete Samples, cast vertically, approximately 18 by 18 by 2 inches (450 by 450 by 50 mm), of finishes, colors, and textures to match design reference sample. Include Sample sets showing the full range of variations expected in these characteristics.

## **1.6 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer and testing agency.
- B. Material Certificates: For each of the following:
  1. Cementitious materials.
  2. Admixtures.
  3. Form materials and form-release agents.
- C. Material Test Reports: For the following, by a qualified testing agency:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

## **1.7 QUALITY ASSURANCE**

- A. **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 "NRMCA Quality Control Manual - Section 3, Certification of Ready Mixed Concrete Production Facilities."
- B. **Testing Agency Qualifications:** Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. **Source Limitations for Cast-in-Place Architectural Concrete:** Obtain each color, size, type, and variety of concrete material and concrete mixture from single manufacturer with resources to provide cast-in-place architectural concrete of consistent quality in appearance and physical properties.
- D. **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 and Section 6, "Architectural Concrete."
  2. ACI 303.1, "Specification for Cast-in-Place Architectural Concrete."
- E. **Mockups:** Before casting architectural concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
  1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
  2. Build mockups of typical exterior wall of cast-in-place architectural concrete as shown on Drawings.
  3. Demonstrate curing, cleaning, and protecting of cast-in-place architectural concrete, finishes, and contraction joints, as applicable.
  4. In presence of Architect, damage part of the exposed-face surface for each finish, color, and texture, and demonstrate materials and techniques proposed for repair of tie holes and surface blemishes to match adjacent undamaged surfaces.
  5. Obtain Architect's approval of mockups before casting architectural concrete.
  6. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

**PART 2 - PRODUCTS****2.1 FORM-FACING MATERIALS**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for formwork and other form-facing material requirements.
- B. Form-Facing Panels for As-Cast Finishes: Steel, glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that will provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- C. Form Liners: Units of face design, texture, arrangement, and configuration to match basis of design product, #512 Hand Hewn Hemlock from Architectural Polymers. Form liner is intended to impart a rustic board like finish. Furnish with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent surface treatments of concrete.
- D. Form Joint Tape: Compressible foam tape; pressure sensitive; AAMA 800, "Specification 810.1, Expanded Cellular Glazing Tape"; minimum 1/4 inch (6 mm) thick.
- E. Form Joint Sealant: Elastomeric sealant complying with ASTM C 920, Type M or Type S, Grade NS, that adheres to form joint substrates.
- F. Sealer: Penetrating, clear, polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration of set-retarding chemicals from wood.
- G. Form-Release Agent: Commercially formulated, colorless form-release agent that will not bond with, stain, or adversely affect architectural concrete surfaces and will not impair subsequent treatments of those surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- H. Form Ties: Factory-fabricated, glass-fiber-reinforced plastic, internally disconnecting, or removable ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish internally disconnecting ties that will leave no metal closer than 1-1/2 inches (38 mm) from the architectural concrete surface.
  - 2. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## **2.2 STEEL REINFORCEMENT AND ACCESSORIES**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for steel reinforcement and other requirements for reinforcement accessories.

## **2.3 CONCRETE MATERIALS**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for concrete materials, mix designs, and curing requirements.

## **2.4 PIGMENT ADMIXTURES**

- A. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ChemMasters, Inc.
    - b. Davis Colors.
    - c. Dayton Superior.
    - d. Hoover Color Corporation.
    - e. Lambert Corporation.
    - f. QC Construction Products.
    - g. Rockwood Pigments NA, Inc.
    - h. Scofield, L. M. Company.
    - i. Solomon Colors, Inc.
  - 2. Color: As selected by Architect from manufacturer's full range.

## **PART 3 - EXECUTION**

### **3.1 FORMWORK**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for formwork, embedded items, and shoring and reshoring.
- B. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.
- C. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class B, 1/4 inch (6 mm).

- D. Fabricate forms to result in cast-in-place architectural concrete that complies with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-in-place surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood rustications, keyways, reglets, recesses, and the like, for easy removal.
  - 1. Seal form joints and penetrations at form ties with form joint tape or form joint sealant to prevent cement paste leakage.
  - 2. Do not use rust-stained steel form-facing material.
- F. 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.
- G. Chamfer exterior corners and edges of cast-in-place architectural concrete.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- L. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and attach securely to prevent deflection and maintain stability of liners during concreting. Prevent form liners from sagging and stretching in hot weather. Seal joints of form liners and form liner accessories to prevent mortar leaks. Coat form liner with form-release agent.

### **3.2 REINFORCEMENT AND INSERTS**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for fabricating and installing steel reinforcement. Securely fasten steel reinforcement and wire ties against shifting during concrete placement.
- B. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### **3.3 REMOVING AND REUSING FORMS**

- A. 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 (10 deg C) 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. Schedule form removal to maintain surface appearance that matches approved mockups.
- B. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved 28-day design compressive strength. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- C. Clean and repair surfaces of forms to be reused in the Work. Do not use split, frayed, delaminated, or otherwise damaged form-facing material. Apply new form-release agent.
- D. 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 cast-in-place architectural concrete surfaces.

### **3.4 JOINTS**

- A. Construction Joints: Install construction joints true to line with faces perpendicular to surface plane of cast-in-place architectural concrete 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.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete. Align construction joint within rustications attached to form-facing material.
  - 3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

### **3.5 CONCRETE PLACEMENT**

- A. General: Comply with Section 033000 "Cast-in-Place Concrete" for concrete placement.

### **3.6 FINISHES, GENERAL**

- A. Architectural Concrete Finish: Match Architect's design reference sample and/or basis of design finish.
- B. Maintain uniformity of special finishes over construction joints unless otherwise indicated.

### **3.7 FINISH SCHEDULE**

- A. Integrally colored concrete shall be used for all surfaces exposed to view for vertical walls, parapets, roof slab, and floor slab (only where indicated).
- B. Utilize form liner to impart a rustic board like finish to all interior and exterior vertical surfaces exposed to view, except the inside face of parapet.

### **3.8 AS-CAST FORMED FINISHES**

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Remove fins and other projections exceeding specified limits on formed-surface irregularities. Repair and patch tie holes and defects.
- B. Form-Liner Finish: Produce a textured surface free of pockets, streaks, and honeycombs, and of uniform appearance, color, and texture.

### **3.9 FIELD QUALITY CONTROL**

- A. General: Comply with field quality-control requirements in Section 033000 "Cast-in-Place Concrete."

### **3.10 REPAIRS, PROTECTION, AND CLEANING**

- A. Repair and cure damaged finished surfaces of cast-in-place architectural concrete when approved by Architect. Match repairs to color, texture, and uniformity of surrounding surfaces and to repairs on approved mockups.
  - 1. Remove and replace cast-in-place architectural concrete that cannot be repaired and cured to Architect's approval.
- B. Protect corners, edges, and surfaces of cast-in-place architectural concrete from damage; use guards and barricades.
- C. Protect cast-in-place architectural concrete from staining, laitance, and contamination during remainder of construction period.

- D. Clean cast-in-place architectural concrete surfaces after finish treatment to remove stains, markings, dust, and debris.
- E. Wash and rinse surfaces according to concrete finish applicator's written instructions. Protect other Work from staining or damage due to cleaning operations.
  - 1. Do not use cleaning materials or processes that could change the appearance of cast-in-place architectural concrete finishes.

**END OF SECTION 033300**

## **SECTION 042200 - CONCRETE UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

1. Decorative concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry joint reinforcement.
5. Miscellaneous masonry accessories.
6. Masonry insulation.

- B. Related Sections:

1. Section 047200 "Cast Stone Masonry" for furnishing cast stone trim.

#### **1.3 DEFINITIONS**

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
  1. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show elevations of reinforced walls.
- C. Samples for Initial Selection:
  1. Decorative CMUs, in the form of small-scale units.
- D. Samples for Verification: For each type and color of the following:

1. Decorative CMUs.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

## **1.5 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For each type and size of the following:
1. Masonry units.
    - a. Include data on material properties.
  2. Cementitious materials. Include brand, type, and name of manufacturer.
  3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
  4. Grout mixes. Include description of type and proportions of ingredients.
  5. Reinforcing bars.
  6. Joint reinforcement.
- 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 according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
  2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

## **1.6 QUALITY ASSURANCE**

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

**1.8 PROJECT CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry

damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **PART 2 - PRODUCTS**

### **2.1 MASONRY UNITS, GENERAL**

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

### **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.
  2. Provide bullnose units for outside corners unless otherwise indicated.
- B. Decorative CMUs: ASTM C 90.
1. Basis of Design Product: York Building Products; Gemstone Ground Face Masonry.
  2. Density Classification: Normal weight.
  3. Size (Width): Manufactured to dimensions 3/8" less than nominal dimensions shown.
  4. Pattern and Texture:
    - a. Standard pattern, ground-face finish. Match basis of design.
  5. Colors: As indicated by basis of design manufacturer's designations. Color 1: Sahara, Color 2: Port, and Color 3: Gingerbread.
  6. Special Aggregate: Provide units made with aggregate matching aggregate in Architect's sample.

### **2.3 MASONRY LINTELS**

- A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure

precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

## 2.4 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Mortar Cement: ASTM C 1329.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
- E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Davis Colors; True Tone Mortar Colors.
    - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
    - c. Solomon Colors, Inc.; SGS Mortar Colors.
- F. Colored Cement Product: Packaged blend made from portland cement and hydrated lime or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Colored Portland Cement-Lime Mix:
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
      - 2) Holcim (US) Inc; Rainbow Mortamix Custom Color Cement/Lime.
      - 3) Lafarge North America Inc; Eaglebond Portland & Lime.
      - 4) Lehigh Hanson; HeidelbergCement Group; Lehigh Custom Color Portland/Lime Cement.

2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
3. Pigments shall not exceed 10 percent of portland cement by weight.
4. Pigments shall not exceed 5 percent of mortar cement by weight.

G. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.

H. Aggregate for Grout: ASTM C 404.

I. Water: Potable.

## 2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60 (Grade 420).

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
5. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dur-O-Wal; a Hohmann & Barnard company; D/A 810, D/A 812 or D/A 817.
  - b. Heckmann Building Products, Inc; No. 376 Rebar Positioner.
  - c. Hohmann & Barnard, Inc; #RB or #RB-Twin Rebar Positioner.

- d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

## 2.7 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 mortar cement mortar unless otherwise indicated.
  3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
  1. For reinforced masonry, use Type S.
  2. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
- 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 mortar cement by weight.
  3. Mix to match Architect's sample.
  4. Application: Use pigmented mortar for exposed mortar joints with the following units:
    - a. Decorative CMUs.
    - b. Cast stone trim units.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
  1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
  2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).

3. Provide grout with a slump of 8 to 11 inches (203 to 279 mm) as measured according to ASTM C 143/C 143M.

## **2.8 MASONRY-CELL INSULATION**

- A. Molded-Polystyrene Insulation Units: Rigid, cellular thermal insulation formed by the expansion of polystyrene-resin beads or granules in a closed mold to comply with ASTM C 578, Type I. Provide specially shaped units designed for installing in cores of masonry units.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Concrete Block Insulating Systems; Korfil.
    - b. Shelter Enterprises Inc.; Omni Core.
- B. Foam-in-Place Insulation: Two component system consisting of amino-plast resin and a catalyst foaming agent surfactant.
  1. Basis of Design product:
    - a. Tailored Chemical Products, Inc.; Core-Fill 500.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
  2. Verify that foundations are within tolerances specified.
  3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION, GENERAL**

- A. Build chases and recesses to accommodate items specified in this and other Sections.

- B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- C. 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.

### 3.3 TOLERANCES

#### A. Dimensions and Locations of Elements:

- 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
- 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
- 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) 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 (6 mm in 3 m), or 1/2 inch (12 mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) 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 (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- 5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
- 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.

#### C. Joints:

- 1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
- 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

### **3.4 LAYING MASONRY WALLS**

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- F. 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.
- G. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

### **3.5 MORTAR BEDDING AND JOINTING**

- A. Lay hollow CMUs as follows:
  1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
  2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
  3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
  4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

- B. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
  - 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
  - 2. Wet joint surfaces thoroughly before applying mortar.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### **3.6 MASONRY JOINT REINFORCEMENT**

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
  - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
  - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
  - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

### **3.7 CONTROL AND EXPANSION JOINTS**

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry using one of the following methods:
  - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
  - 2. Install preformed control-joint gaskets designed to fit standard sash block.

3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

### **3.8 LINTELS**

- A. Provide masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

### **3.9 REINFORCED UNIT MASONRY INSTALLATION**

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
  1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
  2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
  1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
  2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

### **3.10 MASONRY-CELL INSULATION**

- A. Install molded-polystyrene insulation units into masonry unit cells before laying units.
- B. Install foam-in-place insulation into cavities to fill void spaces per manufacturer's written instructions. Maintain inspection ports to show presence of insulation at extremities of each area. Close the ports after filling has been confirmed.

**3.11 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense.
- B. Inspections: Level 1 special inspections according to the "International Building Code."
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Frequency: One set of tests for each 500 sq. ft. of wall area or portion thereof.
- D. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- E. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
- F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

**3.12 REPAIRING, POINTING, AND CLEANING**

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

**3.13 MASONRY WASTE DISPOSAL**

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

**END OF SECTION 042200**

## **SECTION 044313.16 - ADHERED STONE MASONRY VENEER**

### **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. Stone masonry adhered to concrete backup.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each variety of stone, stone accessory, and manufactured product.
- B. Samples for Initial Selection: For colored mortar and other items involving color selection.
- C. Samples for Verification:
  - 1. For each stone type indicated. Include at least three Samples in each set and show the full range of color and other visual characteristics in completed Work.
  - 2. For each color of mortar required. Label Samples to indicate types and amounts of pigments used.

#### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, supply sources, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.

1. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents contained in mockups unless Architect approves such deviations in writing.

## **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
  1. Build mockups for typical exterior wall in sizes approximately 60 inches (1500 mm) long by 24 inches (600 mm) high by full thickness, including face and backup wythes and accessories.
    - a. Include a sealant-filled joint at least 16 inches (400 mm) long in mockup.
  2. Protect accepted mockups from the elements with weather-resistant membrane.
  3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, in a dry location, or in covered weatherproof dispensing silos.

## **1.8 FIELD CONDITIONS**

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
  1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.

- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining stone masonry face.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter using coverings spread on the ground and over the wall surface.
- C. 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 stone masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
  - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

## **1.9 COORDINATION**

- A. Advise installers of other work about specific requirements for placement of flashing and similar items to be built into stone masonry.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from single quarry, whether specified in this Section or in another Section of the Specifications, with resources to provide materials of consistent quality in appearance and physical properties.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from single manufacturer and each aggregate from single source or producer.

### **2.2 LIMESTONE**

- A. Material Standard: Comply with ASTM C 568.
- B. Varieties and Sources: Subject to compliance with requirements, provide the following basis of design product, or a comparable product matching the basis of design product's salient characteristics:
  - 1. Thinset limestone veneer, buff, sawn back, split sides. Available at Wysong Stone; phone number is (937) 962-2559.

**2.3 MORTAR MATERIALS**

- A. Portland Cement: ASTM C 150, Type I or Type II, except Type III may be used for cold-weather construction; natural color or white cement may be used as required to produce mortar color indicated.
  - 1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- 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.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Essroc; Saylor's Plus.
    - b. Holcim (US) Inc; Rainbow Mortamix Custom Color Cement/Lime.
    - c. Lafarge North America Inc; Eaglebond.
    - d. Lehigh Hanson; HeidelbergCement Group; Lehigh Custom Color Portland/Lime Cement.
    - e. Mutual Materials Co; DesignMix Mortar Mix.
- D. Colored Portland Cement-Lime Mix: Packaged blend of portland cement, hydrated lime, and mortar pigments. Mix shall produce color indicated or, if not indicated, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of portland cement by weight.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Holcim (US) Inc; Rainbow Mortamix Custom Color Cement/Lime.
    - b. Lafarge North America Inc; Eaglebond.
    - c. Lehigh Hanson; HeidelbergCement Group; Lehigh Custom Color Portland/Lime Cement.
    - d. Mutual Materials Co; DesignMix Colored Mortar Mix.
- E. Mortar color shall be selected by Architect from manufacturer's full range of available colors.
- F. Aggregate: ASTM C 144 and as follows:
  - 1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 (1.18-mm) sieve.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Euclid Chemical Company (The); an RPM company; [Accelguard 80].
  - b. Grace Construction Products; W.R. Grace & Co. -- Conn; Morset.
  - c. Sonneborn Products; Trimix NCA.

H. Water: Potable.

## **2.4 MASONRY CLEANERS**

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions.
  - b. Dominion Restoration Products.
  - c. EaCo Chem, Inc.
  - d. Hydroclean; Hydrochemical Techniques, Inc.
  - e. PROSOCO, Inc.

## **2.5 FABRICATION**

A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated.

1. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."

B. Cut, split, and select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings and pattern specified in "Setting Stone Masonry" Article.

C. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated. Shape beds to fit supports.

D. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.

1. Clean sawed backs of stone to remove rust stains and iron particles.

E. Gage backs of stones for adhered veneer if more than 81 sq. in. (522 sq. cm) in area.

F. Thickness of Stone: Provide thickness indicated, but not less than the following:

1. Thickness: Varies between 1.5 inches and 2 inches.
- G. Finish exposed stone faces and edges to comply with requirements indicated for finish and to match approved samples and mockups.
1. Finish: Split face matching basis of design product.

## **2.6 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 and/or recommended by manufacturer.
1. Do not use calcium chloride.
  2. Use portland cement-lime 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.
  4. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches required consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
1. Mortar for Setting Stone: Type S.
  2. Mortar for Pointing Stone: Type N.
- C. Cement-Paste Bond Coat: Mix either neat cement and water or cement, sand, and water to a consistency similar to that of thick cream.
- 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 mortar cement by weight.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone masonry.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

### **3.3 SETTING STONE MASONRY**

- A. Perform necessary field cutting and trimming as stone is set.
  - 1. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
  - 2. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- D. Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch (10 mm) at narrowest points or more than 1/2 inch (13 mm) at widest points.
- E. Provide sealant joints of widths and at locations indicated.
  - 1. Keep sealant joints free of mortar and other rigid materials.
  - 2. Sealing joints is specified in Section 079200 "Joint Sealants."
- F. Coat limestone with cementitious dampproofing as follows:

1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches (300 mm) above finish-grade elevations.

### **3.4 CONSTRUCTION TOLERANCES**

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (10 mm in 6 m), or 1/2 inch in 40 feet (13 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (13 mm in 12 m) or more.
- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (13 mm in 12 m) or more.
- C. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet (13 mm in 6 m) or 3/4 inch in 40 feet (19 mm in 12 m) or more.
- D. Measure variation from level, plumb, and position shown in plan as a variation of the average plane of each stone face from level, plumb, or dimensioned plane.
- E. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- F. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

### **3.5 INSTALLATION OF ADHERED STONE MASONRY VENEER**

- A. Coat backs of stone units and face of masonry backup with cement-paste bond coat, then butter both surfaces with setting mortar. Use sufficient setting mortar so a slight excess will be forced out the edges of stone units as they are set. Tap units into place, completely filling space between units and concrete backup.
- B. Rake out joints for pointing with mortar to depth of not less than 1/2 inch (13 mm) before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

### **3.6 POINTING**

- A. Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch (10 mm) deep until a uniform depth is formed.
- B. Point stone joints by placing and compacting pointing mortar in layers of not more than 3/8 inch (10 mm) deep. Compact each layer thoroughly and allow to it become thumbprint hard before applying next layer.

- C. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:

1. Joint Profile: Smooth, flat face slightly below edges of stone.

### **3.7 ADJUSTING AND CLEANING**

- A. Remove and replace stone masonry of the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
2. Defective joints.
3. Stone masonry not matching approved samples and mockups.
4. Stone masonry not complying with other requirements indicated.

- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.

- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.
4. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
5. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20, Revised II, using job-mixed detergent solution.
6. Clean stone masonry with proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean limestone masonry to comply with recommendations in ILI's "Indiana Limestone Handbook."

### **3.8 EXCESS MATERIALS AND WASTE**

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.

- B. Excess Masonry Waste: Remove excess masonry and other waste, and legally dispose of off Owner's property.

### **END OF SECTION 044313.16**

## **SECTION 047200 - CAST STONE MASONRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Cast stone trim including the following:
    - a. Seat wall caps.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
  - 1. For cast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
  - 1. Include plans and elevations showing layout of units and locations of joints and anchors.
- C. Samples for Verification:
  - 1. For each color and texture of cast stone required, 10 inches (250 mm) square in size.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For manufacturer.
  - 1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C 1364.
- B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364.

1. Provide test reports based on testing within previous two years.

## **1.5 QUALITY ASSURANCE**

- A. **Manufacturer Qualifications:** A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute.
- B. **Source Limitations for Cast Stone:** Obtain cast stone units through single source from single manufacturer.
- C. **Source Limitations for Mortar Materials:** Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
  1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
  2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

## **1.7 PROJECT CONDITIONS**

- A. **Cold-Weather Requirements:** Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.
  1. **Cold-Weather Cleaning:** Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.
- B. **Hot-Weather Requirements:** Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

**PART 2 - PRODUCTS****2.1 CAST STONE UNITS**

- A. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wet-cast method.
  - 1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.
- B. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
  - 1. Slope exposed horizontal surfaces to drain unless otherwise indicated.
- C. Fabrication Tolerances:
  - 1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch (3 mm).
  - 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch (3 mm), whichever is greater, but in no case by more than 1/4 inch (6 mm).
  - 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch (3 mm), whichever is greater.
  - 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch (3 mm) on formed surfaces of units and 3/8 inch (10 mm) on unformed surfaces.
- D. Cure units as follows (manufacturer's standard):
  - 1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F (38 deg C) for 12 hours or 70 deg F (21 deg C) for 16 hours.
  - 2. Keep units damp and continue curing to comply with one of the following:
    - a. No fewer than five days at mean daily temperature of 70 deg F (21 deg C) or above.
    - b. No fewer than six days at mean daily temperature of 60 deg F (16 deg C) or above.
    - c. No fewer than seven days at mean daily temperature of 50 deg F (10 deg C) or above.
    - d. No fewer than eight days at mean daily temperature of 45 deg F (7 deg C) or above.
- E. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

- F. Colors and Textures: Provide units with fine-grained texture and buff color resembling Indiana limestone. Color will be selected by Architect from manufacturer's full range.

## **2.2 MORTAR MATERIALS**

- A. Provide mortar materials that comply with Section 042200 "Concrete Masonry Units".

## **2.3 ACCESSORIES**

- A. Anchors: Type and size recommended by manufacturer, fabricated from steel complying with ASTM A 36/A 36M, and hot-dip galvanized to comply with ASTM A 123/A 123M.
- B. Dowels/Threaded Rod: Type and size recommended by manufacturer, 1/2-inch diameter, round bars, fabricated from steel complying with ASTM A 36/A 36M, and hot-dip galvanized to comply with ASTM A 123/A 123M.

## **2.4 MORTAR MIXES**

- A. Comply with requirements in Section 042200 "Concrete Masonry Units" for mortar mixes.

# **PART 3 - EXECUTION**

## **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## **3.2 SETTING CAST STONE IN MORTAR**

- A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
  - 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
- B. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- C. Set units in full bed of mortar unless otherwise indicated.

1. Set units with joints 1/4 to 3/8 inch (6 to 10 mm) wide unless otherwise indicated.
  2. Build anchors and ties into mortar joints as units are set.
  3. Fill dowel holes and anchor slots with mortar.
  4. Keep head joints in units with exposed horizontal surfaces open to receive sealant.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Provide sealant joints at horizontal surfaces, at expansion, control, and pressure-relieving joints, and at locations indicated.
1. Keep joints free of mortar and other rigid materials.
  2. Build in compressible foam-plastic joint fillers where indicated.
  3. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
  4. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

### **3.3 INSTALLATION TOLERANCES**

- A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.
- D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except where variation is due to warpage of units within tolerances specified.

### **3.4 ADJUSTING AND CLEANING**

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
1. Remove mortar fins and smears before tooling joints.

2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
  3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
  5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

**END OF SECTION 047200**

## **SECTION 061000 - ROUGH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Wood blocking and nailers.
  - 2. Plywood backing panels.

#### **1.3 DEFINITIONS**

- A. Exposed Framing: Framing not concealed by other construction.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- C. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. SPIB: The Southern Pine Inspection Bureau.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

## **1.5 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated wood.
  - 2. Power-driven fasteners.
  - 3. Powder-actuated fasteners.
  - 4. Expansion anchors.

## **1.6 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## **PART 2 - PRODUCTS**

### **2.1 WOOD PRODUCTS, GENERAL**

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

**2.2 WOOD-PRESERVATIVE-TREATED LUMBER**

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. All exterior, exposed framing.
  - 2. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 3. Wood sills, sleepers, blocking, stripping, and similar concealed members in contact with masonry or concrete.
  - 4. Wood floor plates that are installed over concrete slabs-on-grade.

**2.3 MISCELLANEOUS LUMBER**

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of the following species:
  - 1. Mixed southern pine; SPIB.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
  - 1. Mixed southern pine; No. 2 grade; SPIB.

- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

## **2.4 PLYWOOD BACKING PANELS**

- A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

## **2.5 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material (Interior): Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Material (Exterior): Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

## 2.6 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to CMU or concrete; coordinate locations with utilities requiring backing panels
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Comply with AWWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without

splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

- I. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
  1. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

### **3.2 WOOD BLOCKING, AND NAILER INSTALLATION**

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

### **3.3 PROTECTION**

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

**END OF SECTION 06100**

## **SECTION 071416 - COLD FLUID-APPLIED WATERPROOFING**

### **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. Polyurethane waterproofing.
  - 2. Latex-rubber waterproofing.

#### **1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review waterproofing requirements including, but not limited to, the following:
    - a. Surface preparation specified in other Sections.
    - b. Minimum curing period.
    - c. Forecasted weather conditions.
    - d. Special details and sheet flashings.
    - e. Repairs.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
  - 2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.
- B. Shop Drawings:
  - 1. Show locations and extent of waterproofing.
  - 2. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

## **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Sample Warranties: For special warranties.

## **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

## **1.7 FIELD CONDITIONS**

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer.
  - 1. Do not apply waterproofing to a damp or wet substrate, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F (3 deg C) above dew point.
  - 2. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

## **1.8 WARRANTY**

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace waterproofing that fails in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.
  - 1. Warranty includes excavation, removing and reinstalling protection board, and restoring surrounding areas to their original condition.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS, GENERAL**

- A. Source Limitations for Waterproofing System: Obtain waterproofing materials and protection course, from single source from single manufacturer. Contractor to provide either system listed below at their option.

**2.2 SINGLE-COMPONENT POLYURETHANE WATERPROOFING**

- A. Single-Component, Reinforced, Modified Polyurethane Waterproofing: ASTM C 836/C 836M and coal-tar free.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Corporation; Construction Systems; MasterSeal HLM 5000.
    - b. Carlisle Coatings & Waterproofing Inc; CCW-525-H or MiraSEAL.
    - c. ITW Polymers Sealants North America; Elasto-Mat 100 (concrete).
    - d. Liquid Plastics Inc; Beta 10, Delta 25, Gama 20, or Omega 15.
    - e. Urethane Polymers International, Inc; Elast-O-Meric BG-7011.

**2.3 LATEX-RUBBER WATERPROOFING**

- A. Two-Component, Reinforced, Latex-Rubber Waterproofing: ASTM C 836/C 836M; coal-tar free.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Grace Construction Products; W.R. Grace & Co. -- Conn; Procor Deck System 3R.
    - b. Soprema, Inc; Fully reinforced waterproofing system.
  2. Hydrostatic-Head Resistance: 197 feet (60 m) minimum; ASTM D 5385.

**2.4 AUXILIARY MATERIALS**

- A. General: Provide auxiliary materials recommended in writing by waterproofing manufacturer for intended use and compatible with one another and with waterproofing.
1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B. Primer: Manufacturer's standard primer, sealer, or surface conditioner; factory-formulated acrylic latex, polyurethane, or epoxy.
- C. Membrane-Reinforcing Fabric: Manufacturer's recommended fiberglass mesh or polyester fabric, manufacturer's standard weight.
- D. Joint Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.
- E. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing; as specified in Section 079200 "Joint Sealants"; and as recommended by manufacturer for substrate and joint conditions.
1. Backer Rod: Closed-cell polyethylene foam.

## 2.5 PROTECTION COURSE

- A. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Henry Company; Asphalt Protection Board.
    - b. Soprema, Inc; Sopraboard.
    - c. W. R. Meadows, Inc; Protection Course.
  2. Thickness: 1/8 inch (3 mm), nominal.
  3. Adhesive: Rubber-based solvent type recommended in writing by waterproofing manufacturer.
- B. Protection Course: Fan folded, with a core of extruded-polystyrene board insulation faced on one side with plastic film, nominal thickness of 1/4 inch (6 mm), with compressive strength of not less than 8 psi (55 kPa) according to ASTM D 1621 and maximum water absorption by volume of 0.6 percent according to ASTM C 272.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical Company (The); Protection Board III.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
  2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, holes, and other voids.

### **3.3 PREPARATION AT TERMINATIONS, PENETRATIONS, AND CORNERS**

- A. Prepare surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, sleeves, and corners according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 1471.
- B. Apply waterproofing in two separate applications, and embed a joint reinforcing strip in the first preparation coat when recommended by waterproofing manufacturer.

### **3.4 JOINT AND CRACK TREATMENT**

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to waterproofing manufacturer's written instructions and to recommendations in ASTM C 1471. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.
  - 1. Comply with ASTM C 1193 for joint-sealant installation.
  - 2. Apply bond breaker on sealant surface, beneath preparation strip.
  - 3. Prime substrate along each side of joint and apply a single thickness of preparation strip at least 6 inches (150 mm) wide along each side of joint. Apply waterproofing in two separate applications and embed a joint reinforcing strip in the first preparation coat.

### **3.5 WATERPROOFING APPLICATION**

- A. Apply waterproofing according to manufacturer's written instructions and to recommendations in ASTM C 1471.
- B. Start installing waterproofing in presence of manufacturer's technical representative.
- C. Apply primer over prepared substrate unless otherwise instructed in writing by waterproofing manufacturer.
- D. Reinforced Waterproofing Applications: Mix materials and apply waterproofing by roller, notched squeegee, trowel, or other suitable application method.

1. Apply first coat of waterproofing, embed membrane-reinforcing fabric, and apply second coat of waterproofing to completely saturate reinforcing fabric and to obtain a seamless reinforced membrane free of entrapped gases and pinholes, with an average dry film total thickness of 80 mils (2 mm).
  2. Apply reinforced waterproofing to prepared wall terminations and vertical surfaces.
  3. Verify manufacturer's recommended wet film thickness of waterproofing every 100 sq. ft. (9.3 sq. m).
- E. Cure waterproofing, taking care to prevent contamination and damage during application and curing.
- F. Install protection course with butted joints over waterproofing before starting subsequent construction operations.
1. For vertical applications, set protection course in nominally cured membrane, which will act as an adhesive. If membrane cures before application of protection course, use adhesive.

### **3.6 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner reserves the right to engage a qualified testing agency to perform tests and inspections:
1. Testing agency shall verify thickness of waterproofing during application for each 100 sq. ft. of installed waterproofing or part thereof.
- B. Manufacturer's Field Service: Engage a full-time site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components and to furnish daily reports to Architect.
- C. If test results or inspections show waterproofing does not comply with requirements, remove and replace or repair the waterproofing as recommended in writing by manufacturer, and make further repairs after retesting and inspecting until waterproofing installation passes.
- D. Prepare test and inspection reports.

### **3.7 PROTECTION**

- A. Protect waterproofing from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

### **END OF SECTION 071416**

## **SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Roof insulation.

- B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
3. Section 329700 "Vegetated Roof Assemblies" for intensive roof system to be installed over membrane roofing.

#### **1.3 DEFINITIONS**

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

#### **1.4 PREINSTALLATION MEETINGS**

- A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

### **1.5 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
  1. Base flashings and membrane terminations.
  2. Tapered insulation, including slopes.

### **1.6 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
  1. Submit evidence of compliance with performance requirements.
- C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- E. Sample Warranties: For manufacturer's special warranties.

### **1.7 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For roofing system to include in maintenance manuals.

### **1.8 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

### **1.9 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
  - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

### **1.10 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

### **1.11 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
  - 1. Special warranty includes roofing, base flashings, roof insulation, and other components of roofing system.
  - 2. Warranty Period: 15 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section, including all components of roofing system such as roofing, base flashing, roof insulation, and fasteners, for the following warranty period:
  - 1. Warranty Period: 2 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with requirements, provide a product by one of the following:
1. Carlisle SynTec Incorporated.
  2. Firestone Building Products.
  3. GAF Materials Corporation.
  4. GenFlex Roofing Systems.
  5. Johns Manville; a Berkshire Hathaway company.
  6. Mule-Hide Products Co., Inc.
  7. Versico Incorporated.
- B. Source Limitations: Obtain components including roof insulation for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

### **2.2 PERFORMANCE REQUIREMENTS**

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a built-up roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
1. Fire/Windstorm Classification: Class 1A-60.
  2. Hail-Resistance Rating: MH.

### **2.3 TPO ROOFING**

- A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.
  - 1. Thickness: 60 mils (1.5 mm), nominal.
  - 2. Exposed Face Color: Tan.

### **2.4 AUXILIARY ROOFING MATERIALS**

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Slip Sheet: Manufacturer's standard, of thickness required for application.
- E. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

### **2.5 ROOF INSULATION**

- A. General: Preformed roof insulation boards manufactured or approved by TPO roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

### **2.6 INSULATION ACCESSORIES**

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.

2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread spray-applied, low-rise, two-component urethane adhesive.

## **2.7 ASPHALT MATERIALS**

- A. Roofing Asphalt: ASTM D 312, Type III or Type IV.
- B. Asphalt Primer: ASTM D 41/D 41M.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

### **3.3 ROOFING INSTALLATION, GENERAL**

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

### **3.4 INSULATION INSTALLATION**

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.

- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
  - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
  - 1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. (0.3 L/sq. m), and allow primer to dry.
  - 2. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
  - 3. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
  - 4. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- H. Install slip sheet over insulation and immediately beneath roofing.

### **3.5 ADHERED ROOFING INSTALLATION**

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.

- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

### **3.6 BASE FLASHING INSTALLATION**

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

### **3.7 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
  - 1. Flood to an average depth of 2-1/2 inches (65 mm) with a minimum depth of 1 inch (25 mm) and not exceeding a depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of base flashing.
  - 2. Flood each area for 48 hours.
  - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.

- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

### **3.8 PROTECTING AND CLEANING**

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

**END OF SECTION 075423**

## **SECTION 079200 - JOINT SEALANTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Mildew-resistant joint sealants.
  - 4. Latex joint sealants.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

## **1.5 QUALITY ASSURANCE**

- A. **Installer Qualifications:** An authorized representative who is trained and approved by manufacturer.
- B. **Mockups:** Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

## **1.6 FIELD CONDITIONS**

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

## **1.7 WARRANTY**

- A. **Special Installer's Warranty:** Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. **Warranty Period:** Two years from date of Substantial Completion.
- B. **Special Manufacturer's Warranty:** Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. **Warranty Period:** Five years from date of Substantial Completion.
- C. **Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:**
  - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
  - 2. Disintegration of joint substrates from causes exceeding design specifications.
  - 3. Mechanical damage caused by individuals, tools, or other outside agents.
  - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

**PART 2 - PRODUCTS****2.1 JOINT SEALANTS, GENERAL**

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

**2.2 SILICONE JOINT SEALANTS**

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 791.
    - b. GE Construction Sealants; SCS2000 SilPruf.
    - c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 265 LTS.
    - d. Pecora Corporation; PCS.
    - e. Sika Corporation U.S.; Sikasil WS-295.

**2.3 NONSTAINING SILICONE JOINT SEALANTS**

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 756 SMS or 795.
    - b. GE Construction Sealants; SilPruf NB.
    - c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 295 FPS NB.
    - d. Pecora Corporation; 864NST.
    - e. Tremco Incorporated; Spectrem 2.

## 2.4 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals, LLC, Building Systems; Sonalastic TX1.
    - b. Bostik, Inc.; Chem-Calk GPS1.
    - c. ER Systems, an ITW Company; Pacific Polymers Elasto-Thane 230 MP.
    - d. Pecora Corporation; Dynatrol I-XL.
    - e. Polymeric Systems, Inc.; Flexiprene 1000.
    - f. Schnee-Morehead, Inc., an ITW company; Permathane SM7108.
    - g. Sherwin-Williams Company (The); Stampede-1.
    - h. Sika Corporation U.S.; Sikaflex Textured Sealant.
    - i. Tremco Incorporated; Dymonic.
- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals, LLC, Building Systems; Sonolastic SL 1.
    - b. Pecora Corporation; NR-201.
    - c. Polymeric Systems, Inc.; Flexiprene 952.
    - d. Schnee-Morehead, Inc.; an ITW company; Permathane SM7101.
    - e. Sherwin-Williams Company (The); Stampede 1SL.
- C. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. LymTal International, Inc.; Iso-Flex 888QC.

## 2.5 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability,

nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Dow Corning Corporation; 786-M White.
  - b. GE Construction Sealants; SCS1700 Sanitary.
  - c. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
  - d. Soudal USA; RTV GP.
  - e. Tremco Incorporated; Tremsil 200.

## **2.6 LATEX JOINT SEALANTS**

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals, LLC, Building Systems; Sonolac.
    - b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex 600.
    - c. Pecora Corporation; AC-20.
    - d. Sherwin-Williams Company (The); 850A.
    - e. Tremco Incorporated; Tremflex 834.

## **2.7 JOINT-SEALANT BACKING**

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## **2.8 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
  - 3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
  - a. Metal.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### **3.3 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  1. Place sealants so they directly contact and fully wet joint substrates.
  2. Completely fill recesses in each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs

below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

### **3.4 CLEANING**

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### **3.5 PROTECTION**

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

### **3.6 JOINT-SEALANT SCHEDULE**

- A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
  1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
  2. Joint Sealant: Urethane, M, P, 50, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  1. Joint Locations:
    - a. Joints in concrete and unit masonry.
    - b. Joints between different materials listed above.
    - c. Perimeter joints between materials listed above and frames of doors, windows, and louvers.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
1. Joint Locations:
    - a. Isolation joints in cast-in-place concrete slabs.
  2. Joint Sealant: Urethane, S, P, 25, T, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Vertical joints on exposed surfaces of concrete and unit masonry, walls, and partitions.
  2. Joint Sealant: Urethane, S, NS, 25, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
    - a. Perimeter joints between interior wall surfaces and frames of interior doors.
  2. Joint Sealant: Acrylic latex.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
  2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

**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 hollow-metal work.
- B. Related Requirements:
  - 1. Section 087111 "Door Hardware (Descriptive Specification)" for door hardware for hollow-metal doors.

#### **1.3 DEFINITIONS**

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### **1.4 COORDINATION**

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

#### **1.5 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.
  - 4. Locations of reinforcement and preparations for hardware.
  - 5. Details of each different wall opening condition.
  - 6. Details of anchorages, joints, field splices, and connections.
  - 7. Details of accessories.

8. Details of conduit and preparations for power, signal, and control systems.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-(102-mm-)high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Amweld International, LLC.
  2. Ceco Door Products; an Assa Abloy Group company.
  3. Curries Company; an Assa Abloy Group company.
  4. Deansteel.
  5. Karpen Steel Custom Doors & Frames.
  6. L.I.F. Industries, Inc.
  7. LaForce, Inc.
  8. Mesker Door Inc.
  9. Pioneer Industries, Inc.
  10. Republic Doors and Frames.
  11. Shanahans Manufacturing Ltd.
  12. Steelcraft; an Ingersoll-Rand company.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

### **2.2 HOLLOW-METAL DOORS AND FRAMES**

- A. Construct doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
  1. Physical Performance: Level A according to SDI A250.4.
  2. Doors:

- a. Type: As indicated in the Door and Frame Schedule.
- b. Thickness: 1-3/4 inches (44.5 mm.)
- c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
- d. Edge Construction: Model 1, Full Flush.
- e. Core: Manufacturer's standard, foamed-in-place, polyurethane core; steel-stiffened as need.

- 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance R-value of not less than 12 when tested according to ASTM C 1363.

3. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
- b. Construction: Full profile welded.

4. Exposed Finish: Prime.

## 2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.

## 2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
  1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

- F. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- G. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.5 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
  - 1. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
  - 2. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
  - 3. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
  - 4. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
  - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 2. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 3. Jamb Anchors: Provide number and spacing of anchors as follows:
    - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
      - 1) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
  - 4. 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.

- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to 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 applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

## **2.6 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 SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## **2.7 ACCESSORIES**

- A. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

### 3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. Install door silencers in frames before grouting.
    - b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - c. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - d. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
  - 2. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
  - 3. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
  - 1. Non-Fire-Rated Steel Doors:
    - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
    - b. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
    - c. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

### **3.4 ADJUSTING AND CLEANING**

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

**END OF SECTION 081113**

## **SECTION 086250 - TUBULAR DAYLIGHTING DEVICES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Tubular daylighting deviceS.
- B. Accessories.

#### **1.2 RELATED SECTIONS**

- A. Section 075423 “Thermoplastic Polyolefin (TPO) Roofing” for flashing.
- B. Division 26 Sections for electrical connections.

#### **1.3 PERFORMANCE REQUIREMENTS**

- A. Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
  - 1. Air Infiltration Test:
    - a. Single and Dual Glazed Dome (M74 DS Type DP & DPP): meets or exceeds the air leakage performance levels with a maximum 0.4 cfm/ft<sup>2</sup> when tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 and ASTM E 283.
    - b. Air exfiltration will not exceed 0.4 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
  - 2. Fire Testing:
    - a. Self-Ignition Temperature - Greater than 650 degrees F per ASTM D-1929.
    - b. Smoke Density: Rating no greater than 450 per ASTM Standard E 84 in way intended for use. Classification C.
    - c. Rate of Burn and/or Extent: Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2 per ASTM D 635.

#### **1.4 SUBMITTALS**

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.

- B. Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.
- C. Electrical wiring diagrams for connection of LED fixtures.
- D. Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.

## **1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Engaged in manufacture of tubular daylighting devices for minimum 5 years.
- B. LED equipment certified and labeled by UL and CSA labels.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## **1.7 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## **1.8 WARRANTY**

- A. Daylighting Device: Manufacturer's standard warranty for 10 years.
- B. Electrical Parts: Manufacturer's standard warranty for 5 years, unless otherwise indicated.
- C. LED Emitters, Drivers and Controls: Manufacturer's standard warranty for 3 years against failure.

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Basis of Design Manufacturer: Solatube International, Inc.

### **2.2 TUBULAR DAYLIGHTING DEVICES WITH LED FIXTURE**

- A. Tubular Daylighting Devices General: Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICC AC-16. Tubular daylighting device shall have integrated LED fixture including daylight harvesting and available occupancy controls.

## B. Solatube Smart LED System: Solatube Model S160 SL.

1. Roof Dome Assembly: 10 inch (250 mm) transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
  - a. Outer Dome Glazing: Type DU 0.125 inch (3 mm) minimum thickness injection molded acrylic classified as CC1 material; UV inhibiting (100 percent UV C, 100 percent UV B and 98.5 percent UV A), impact modified acrylic blend.
  - b. Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
  - c. LightTracker Reflector: Aluminum sheet, thickness 0.015 inch (0.4 mm) with Spectralight Infinity. Positioned in dome to capture low angle sunlight.
2. Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
  - a. Base Material: Sheet steel, corrosion resistant, meeting ASTM A 653/A 653M or ASTM A 463/A 463M or ASTM A792/A 792M, 0.028 inch (0.7 mm) plus or minus .006 inch (.015 mm) thick.
  - b. Base Flat: Flat Type F4, no pitch 4 inches (102 mm) high.
3. Roof Flashing Turret Extensions: Provide manufacturer's standard extensions for applications requiring:
  - a. Type T2: Additional lengths of 2 inches (50 mm) extension.
4. Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact acrylic; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
5. Reflective Extension Tube: Aluminum sheet, thickness 0.015 inch (0.4 mm).
  - a. Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
  - b. Color: a\* and b\* (defined by CIE L\*a\*b\* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
  - c. Tube Diameter: Approximately 10 inches (250 mm).

6. Reflective 30 degree Adjustable tube: Aluminum sheet, thickness .015 inch (0.4 mm).
  - a. Interior Finish: Spectralight Infinity with Cool Tube Technology combining ultra-high Visible Light reflectance with Ultra-low Infrared (IR) reflectance. Patented spectrally-selective optical surface yields specular reflectance greater than 99 percent for the Visible Light spectrum (400 nm to 760 nm) and less than 20% reflectance for Infrared (IR) wavelengths longer than 980nm, resulting in a spectrally-selective Total Solar Spectrum (400 nm to 2500 nm) less than 80.2 percent.
7. Solatube IC-rated Smart LED Primary Fixture: Type 430P LED Light Fixture, 14 inch diameter (350 mm). UL and CSA Listed.
  - a. Amplifier Housing: Injection molded polycarbonate housing with minimum thickness of 0.078 inches (2 mm), overall outer diameter of 16.33 inches (415 mm) tapering to an outer diameter of 9.84 inches (250 mm) and 8.26 inches (210 mm) tall. Housing includes an integrated ceiling ring with nominal thickness of 0.110 inches (2.8 mm).
  - b. Amplifier: One piece of Spectralight specular, enhanced aluminum consisting of 16 facets with a minimum thickness of 0.015 inches (0.39 mm), mechanically secured to inside of housing.
  - c. Amplifier/Heat Sync system maintains LED junction temperature < 92 degrees C at Attic Ambient < 50 degrees C.
  - d. Daylight Sensor: Factory set photo cell offers continuous LED ON/OFF modulation according to daylight intensity.
  - e. Light Optimizing Lens: Fresnel lens technology redirects both solar and electric light down to diffuser assembly. Minimum 0.031 inches (0.8 mm) thick.
  - f. Light Emitting Diodes (LED): Four 3000K high efficacy emitters at a CRI = 80. Color variation is maintained within 4-step MacAdam Ellipse. LED are bonded to amplifier/heat-sink with thermal transfer adhesive and mechanically secured to amplifier with fasteners concealed under amplifier housing.
  - g. Driver: UL and CSA Listed. Universal input values ranging between 100 and 240V input at 50-60Hz. Rated output power 32 watts. Mounted remote from luminaire and enclosed in junction box assembly.
    - 1) Dedicated cable connects Driver to Primary Smart LED Amplifier Controller through unique 2-pin polarized plug connector.
    - 2) Cable Length 4 feet (1220 mm) from driver to Smart LED primary luminaire.

### 2.3 ACCESSORIES

- A. Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.

- B. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Coordinate requirements for power supply, conduit and wiring.

#### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's printed instructions.
- B. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of Owner, Architect, or Contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.
- C. Inspect installation to verify secure and proper mounting. Test each fixture to verify operation, control functions, and performance. Correct deficiencies.

#### **3.4 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 086250**

## **SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)**

### **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.
- B. Owner's Security Vendor is Northwest Security. Contact them at phone number 877-207-4220.

#### **1.2 SUMMARY**

- A. Section includes:
  - 1. Mechanical door hardware for the following:
    - a. Swinging doors.
- B. Related Sections:
  - 1. Section 081113 "Hollow Metal Doors and Frames" for door silencer preparation provided as part of hollow-metal frames.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Other Action Submittals:
  - 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
    - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

- b. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Document Drawings.
  - c. Content: Include the following information:
    - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
    - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
    - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
    - 4) Fastenings and other pertinent information.
    - 5) Explanation of abbreviations, symbols, and codes contained in schedule.
    - 6) Mounting locations for door hardware.
    - 7) List of related door devices specified in other Sections for each door and frame.
2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and Architectural Hardware Consultant.
- B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- C. Warranty: Special warranty specified in this Section.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.

#### **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Warehousing Facilities: In Project's vicinity.
  2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:
1. For door hardware, an Architectural Hardware Consultant (AHC).
- C. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
  2. Comply with the following maximum opening-force requirements:
    - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
  3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
  4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.
- F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Specifications. In addition to Owner, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's security consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for incorporation into Owner's key control system.
  4. Address for delivery of keys.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to Owner.

## **1.8 COORDINATION**

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: Coordinate installation of door hardware and keying with Owner's security consultant.

## **1.9 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of doors and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
    - a. Manual Closers: 10 years from date of Substantial Completion.

## **1.10 MAINTENANCE SERVICE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

## **PART 2 - PRODUCTS**

### **2.1 SCHEDULED DOOR HARDWARE**

- A. Provide door hardware for each door as scheduled on Contract Document Drawings to comply with requirements in this Section.
  - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in "Door Hardware Schedule". Products are identified by descriptive titles corresponding to requirements specified in Part 2.

### **2.2 HINGES**

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bommer Industries, Inc.
    - b. Hager Companies.
    - c. IVES Hardware; an Ingersoll-Rand company.
    - d. McKinney Products Company; an ASSA ABLOY Group company.
    - e. PBB, Inc.
    - f. Stanley Commercial Hardware; Div. of The Stanley Works.
- B. Antifriction-Bearing Hinges:
  - 1. Mounting: Full mortise (butts).
  - 2. Bearing Material: Manufacturer's standard antifriction bearing.
  - 3. Grade: Grade 1 (heavy weight).
  - 4. Base and Pin Metal:
    - a. Stainless steel with stainless-steel pin.
  - 5. Pins: Non-rising loose unless otherwise indicated.

- a. Nonremovable.
- 6. Tips: Flat button.
- 7. Corners: Square.

## **2.3 MECHANICAL LOCKS AND LATCHES**

- A. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
  - 1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
- B. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
- C. Lock Trim:
  - 1. Description: As selected by Owner/Architect from manufacturer's full range of available designs.
  - 2. Levers: Cast.
  - 3. Escutcheons (Roses): Wrought, forged, or cast.
  - 4. Operating Device: Lever with escutcheons (roses).
- D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
  - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
- E. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
    - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
    - d. Schlage Commercial Lock Division; an Ingersoll-Rand company.
    - e. Yale Security Inc.; an ASSA ABLOY Group company.

## **2.4 ELECTRIC STRIKES**

- A. Electric Strikes: BHMA A156.31; Grade 1; with faceplate to suit lock and frame.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Adams Rite Manufacturing Co; an ASSA ABLOY Group company.
  - b. Dortronics Systems, Inc.
  - c. DynaLock Corp.
  - d. Folger Adam, a brand of HES; an ASSA ABLOY Group company.
  - e. HES, Inc.; an ASSA ABLOY Group company.
  - f. Security Door Controls.
  - g. Von Duprin; an Allegion brand.
2. Material: Stainless steel.
3. Mounting: Mortised.
4. Monitoring: Mechanical strike.
5. Options: Lip extension kit, if required.

## **2.5 LOCK CYLINDERS**

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
    - b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
    - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
    - d. Schlage Commercial Lock Division; an Ingersoll-Rand company.
    - e. Yale Security Inc.; an ASSA ABLOY Group company.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1; permanent cores that are removable; face finished to match lockset.
  1. Number of Pins: Six.
  2. Type: Mortise.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

## **2.6 KEYING**

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
  1. Master Key System: Change keys and a master key operate cylinders.

- a. Master key locks to Owner's existing system.
  2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Nickel silver.
1. Stamping: Permanently inscribe each key with a visual key control number
  2. Quantity: In addition to one extra key blank for each lock, provide the following:
    - a. Cylinder Change Keys: Three.
    - b. Master Keys: Five.

## **2.7 SURFACE CLOSERS**

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
    - b. DORMA Architectural Hardware; Member of The DORMA Group North America.
    - c. LCN Closers; an Ingersoll-Rand company.
    - d. Norton Door Controls; an ASSA ABLOY Group company.
    - e. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
    - f. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
    - g. Yale Security Inc.; an ASSA ABLOY Group company.
- B. Surface Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.
1. Mounting: Hinge side, unless other option is dictated by application.
  2. Type: Regular arm.
  3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
  4. Cover Material: Molded plastic.
  5. Closing Power Adjustment: At least 35 percent more than minimum tested value.
  6. Stops: Provide overhead dead stops on closers.

## 2.8 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-(1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Burns Manufacturing Incorporated.
    - b. Don-Jo Mfg., Inc.
    - c. Hiawatha, Inc; a division of the Activar Construction Products Group.
    - d. InPro Corporation (IPC).
    - e. Pawling Corporation.
    - f. Rockwood Manufacturing Company; an ASSA ABLOY Group company.
    - g. Trimco.
- B. Kick Plates: 8 inches high by door width with allowance for frame stops.

## 2.9 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
  - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
  - 2. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

## **2.10 FINISHES**

- A. Provide finishes complying with BHMA A156.18. Finishes shall be 630 (US32D) stainless steel.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

### **3.3 INSTALLATION**

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
1. Replace construction cores with permanent cores as indicated in keying schedule.

### **3.4 ADJUSTING**

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

### **3.5 CLEANING AND PROTECTION**

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

### **3.6 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.

**END OF SECTION 087111**

## **SECTION 102113 - TOILET COMPARTMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Solid-polymer toilet compartments configured as toilet enclosures and urinal screens.
- B. Related Sections:
  - 1. Section 102800 "Toilet, Bath, and Laundry Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show locations of reinforcements for compartment-mounted grab bars.
  - 2. Show locations of centerlines of toilet fixtures.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
  - 1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of toilet compartment, from manufacturer.

## **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

## **1.6 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 200 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

## **1.7 PROJECT CONDITIONS**

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless-Steel Castings: ASTM A 743/A 743M.

### **2.2 SOLID-POLYMER UNITS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Accurate Partitions Corp.; ASI Group.
  - 2. Ampco Products, LLC.
  - 3. Bradley Corporation; Mills Partitions.

4. Columbia Lockers; Partition Systems International of South Carolina.
  5. Comtec Industries/Capitol Partitions.
  6. General Partitions Mfg. Corp.
  7. Global Partitions; ASI Group.
  8. Hadrian Manufacturing Inc.
  9. Knickerbocker Partition Corporation.
  10. Metpar Corp.
  11. Santana Products, Inc.
  12. Weis-Robart Partitions, Inc.
- B. Toilet-Enclosure Style: Ceiling hung.
- C. Urinal-Screen Style: Wall hung.
- D. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) or polypropylene (PP) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, no-sightline system, 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-polymer components to prevent burning.
  2. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.
- E. Pilaster Sleeves (Caps): Manufacturer's standard design; stainless steel.
- F. Brackets (Fittings):
1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum or stainless steel.
- G. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid polymer.

### 2.3 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
1. Material: Clear-anodized aluminum or Stainless steel.
  2. Hinges: Manufacturer's standard continuous, cam type that swings to a closed or partially open position.
  3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
  5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
  6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel.

## **2.4 FABRICATION**

- A. Ceiling-Hung Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for connection to structural support at ceiling. Provide assemblies that support pilasters from structure. Provide sleeves (caps) at tops of pilasters to conceal anchorage.
- B. Door Size and Swings: Unless otherwise indicated, provide 24-inch-(610-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch-(914-mm-) wide, out-swinging doors with a minimum 32-inch-(813-mm-) wide, clear opening for compartments designated as accessible.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- 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.
1. Maximum Clearances:
    - a. Pilasters and Panels: 1/2 inch (13 mm).
    - b. Panels and Walls: 1 inch (25 mm).
- B. Ceiling-Hung Units: Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.

### **3.2 ADJUSTING**

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

**END OF SECTION 102113**

## **SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Restroom accessories.
  - 2. Underlavatory guards.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include the following:
  - 1. Construction details and dimensions.
  - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
  - 3. Material and finish descriptions.
  - 4. Features that will be included for Project.
  - 5. Manufacturer's warranty.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Warranty: Sample of special warranty.

#### **1.5 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

## **1.6 QUALITY ASSURANCE**

- A. Source Limitations: For products listed together in the Toilet Room Accessories Schedule, obtain products from single source from single manufacturer.

## **1.7 COORDINATION**

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.
- B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.
- D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.
- E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

### **2.2 RESTROOM ACCESSORIES**

- A. Basis-of-Design Products: Provide products from Bobrick Washroom Equipment, Koala Kare, and Dyson, as indicated on drawings, or comparable products by one of the following:
  - 1. American Specialties Inc.
  - 2. Bradley Corporation

- B. Basis of Design Restroom Accessories are indicated on the drawings, and include the following:
  - 1. Baby Changing Station
  - 2. Toilet Tissue (Roll) Dispenser
  - 3. Hand Dryer
  - 4. Toilet Seat Cover Dispenser
  - 5. Waste Receptacle
  - 6. Feminine Napkin Receptacle
  - 7. Grab Bars
  - 8. Mirror Unit

### **2.3 UNDERLAVATORY GUARDS**

- A. Underlavatory Guard
  - 1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
  - 2. Material and Finish: Antimicrobial, molded plastic, white.

### **2.4 FABRICATION**

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F 446.

**3.2 ADJUSTING AND CLEANING**

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

**END OF SECTION 102800**

## SECTION 329200 - TURF AND GRASSES

### 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. Seeding.
- 2. Hydroseeding.
- 3. Sodding.
- 4. Turf renovation.

- B. Related Sections:

- 1. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading.

#### 1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of each seed mixture for turfgrass sod and/or plugs. Include identification of source and name and telephone number of supplier.
- C. Qualification Data: For qualified landscape Installer.
- D. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- E. Material Test Reports: For standardized ASTM D 5268 topsoil, existing native surface topsoil, existing in-place surface soil, and/or imported or manufactured topsoil; depending on what is proposed to be utilized for final topsoil.
  - 1. Test Reports need to show any required amendments to optimize topsoil for turf and grass type crop growth.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and meadows during a calendar year. Submit before expiration of required initial maintenance periods.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf and meadow establishment.
  - 1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
  - 2. Experience: Five years' experience in turf installation in addition to requirements in Division 01 Section "Quality Requirements."
  - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
    - a. Certified Landscape Technician - Exterior, with installation, maintenance with an irrigation specialty area(s) if irrigation system is included, designated CLT-Exterior.
    - b. Certified Turfgrass Professional, designated CTP.
    - c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.
  5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
  6. Pesticide Applicator: State licensed, commercial.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
  2. The Contractor shall submit a soil sampling exhibit showing depth, location, and number of samples taken per instructions from Landscape Architect. A minimum of three representative samples shall be taken from varied locations, each soil type to be used, and any amended soils to produce topsoil for planting purposes.
  3. Report suitability of tested soil for turf growth.
    - a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Preinstallation Conference: Conduct conference at Project site.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
  - B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation"

in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: April (after the last freeze) – June 1st
2. Fall Planting: Mid-August – September 30th (Soil Temperatures between 55 and 75 degrees).

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 60 days from date of Substantial Completion.
  - a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.
2. Sodded Turf: 30 days from date of Substantial Completion.

B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 60 days from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances and consists of only seed ranked in the top 10 seed species per the current NTEP report.
- B. Seed Species: State-certified and top 10 NTEP ranked grass species as follows:
- C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
  - 1. Full Sun: Proportioned by weight as follows:
    - a. 50 percent - Kentucky bluegrass (*Poa pratensis*), a minimum of two "Improved" cultivars.
    - b. 50 percent - Perennial Ryegrass, three "Improved" cultivars.
  - 2. Sun and Partial Shade: Proportioned by weight as follows:
    - a. 50 percent Kentucky bluegrass (*Poa pratensis*), minimum of two "Improved" cultivars.
    - b. 30 percent chewings red fescue (*Festuca rubra* variety).
    - c. 10 percent perennial ryegrass (*Lolium perenne*).
    - d. 10 percent redtop (*Agrostis alba*).
  - 3. Shade: Proportioned by weight as follows:
    - a. 50 percent chewings red fescue (*Festuca rubra* variety), a minimum of two "Improved" cultivars.
    - b. 35 percent rough bluegrass (*Poa trivialis*).
    - c. 15 percent redtop (*Agrostis alba*).

### 2.2 TURFGRASS SOD

- A. Turfgrass Sod: Certified and includes limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Sod of grass species as follows, with not less than 90 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:
  - 1. Full Sun: Proportioned by weight as follows:
    - a. 50 percent - Kentucky bluegrass (*Poa pratensis*), a minimum of two "Improved" cultivars.
    - b. 50 percent - Perennial Ryegrass, three "Improved" cultivars.

2. Sun and Partial Shade: Proportioned by weight as follows:
  - a. 50 percent Kentucky bluegrass (*Poa pratensis*), minimum of two “Improved” cultivars.
  - b. 30 percent chewings red fescue (*Festuca rubra* variety).
  - c. 10 percent perennial ryegrass (*Lolium perenne*).
  - d. 10 percent redtop (*Agrostis alba*).
3. Shade: Proportioned by weight as follows:
  - a. 50 percent chewings red fescue (*Festuca rubra* variety) , a minimum of two “Improved” cultivars.
  - b. 35 percent rough bluegrass (*Poa trivialis*).
  - c. 15 percent redtop (*Agrostis alba*).

### 2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
  1. Class: T, with a minimum of 99 percent passing through No. 8 sieve and a minimum of 75 percent passing through No. 60 sieve.
  2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
  3. Provide lime in form of ground dolomitic limestone.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.
- G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
- H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

## 2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.
  - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
  - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

## 2.5 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
  - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
  - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS (as required by drawings)

- A. Planting Soil (Manufactured): ASTM D 5268 topsoil, with pH range of 5.5 to 7, a minimum of 4 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth. Mix ASTM D 5268 topsoil with the following soil amendments and fertilizers as directed in the Soil Testing Report's recommended quantities to produce planting soil:
1. Ratio of Loose Compost to Topsoil by Volume: Per Soils Testing Report.
  2. Ratio of Loose Sphagnum Peat to Topsoil by Volume: Per Soils Testing Report.
  3. Ratio of Loose Wood Derivatives to Topsoil by Volume: Per Soils Testing Report.
  4. Weight of Lime per 1000 Sq. Ft.: Per Soils Testing Report.
  5. Weight of Sulfur per 1000 Sq. Ft.: Per Soils Testing Report.
  6. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Per Soils Testing Report.
  7. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Per Soils Testing Report.
  8. Weight of Bonemeal per 1000 Sq. Ft.: Per Soils Testing Report.
  9. Weight of Superphosphate per 1000 Sq. Ft.: Per Soils Testing Report.
  10. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
  11. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
- B. Planting Soil (Native / Virgin): Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation or grading processes. Verify suitability of native surface topsoil to produce viable planting soil through required soil testing. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
1. Supplement with amendments and fertilizers as directed in the Soil Testing Report's recommended quantities to produce planting soil when existing quantities are insufficient.
  2. Mix existing, native surface topsoil with the following soil amendments and fertilizers as directed in the Soil Testing Report's recommended quantities to produce planting soil:
    - a. Ratio of Loose Compost to Topsoil by Volume: Per Soils Testing Report.
    - b. Ratio of Loose Sphagnum Peat to Topsoil by Volume: Per Soils Testing Report.
    - c. Ratio of Loose Wood Derivatives to Topsoil by Volume: Per Soils Testing Report.
    - d. Weight of Lime per 1000 Sq. Ft.: Per Soils Testing Report.
    - e. Weight of Sulfur per 1000 Sq. Ft.: Per Soils Testing Report.
    - f. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Per Soils Testing Report.
    - g. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Per Soils Testing Report.
    - h. Weight of Bonemeal per 1000 Sq. Ft.: Per Soils Testing Report.
    - i. Weight of Superphosphate per 1000 Sq. Ft.: Per Soils Testing Report.
    - j. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
    - k. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.

- C. Planting Soil (Existing Non-Native/Virgin): Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers as directed in the Soil Testing Report's recommended quantities to produce planting soil::
1. Ratio of Loose Compost to Topsoil by Volume: Per Soils Testing Report.
  2. Ratio of Loose Sphagnum Peat to Topsoil by Volume: Per Soils Testing Report.
  3. Ratio of Loose Wood Derivatives to Topsoil by Volume: Per Soils Testing Report.
  4. Weight of Lime per 1000 Sq. Ft.: Per Soils Testing Report.
  5. Weight of Sulfur per 1000 Sq. Ft.: Per Soils Testing Report.
  6. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Per Soils Testing Report.
  7. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Per Soils Testing Report.
  8. Weight of Bonemeal per 1000 Sq. Ft.: Per Soils Testing Report.
  9. Weight of Superphosphate per 1000 Sq. Ft.: Per Soils Testing Report.
  10. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
  11. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
- D. Planting Soil (Imported): Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.
1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes, grubs, other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled, pore-space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
  2. Mix imported topsoil or manufactured topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
    - a. Ratio of Loose Compost to Topsoil by Volume: Per Soils Testing Report.
    - b. Ratio of Loose Sphagnum Peat to Topsoil by Volume: Per Soils Testing Report.
    - c. Ratio of Loose Wood Derivatives to Topsoil by Volume: Per Soils Testing Report.
    - d. Weight of Lime per 1000 Sq. Ft.: Per Soils Testing Report.
    - e. Weight of Sulfur, Iron Sulfate, or Aluminum Sulfate per 1000 Sq. Ft.: Per Soils Testing Report.
    - f. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Per Soils Testing Report.
    - g. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Per Soils Testing Report.

- h. Weight of Bonemeal per 1000 Sq. Ft.: Per Soils Testing Report.
- i. Weight of Superphosphate per 1000 Sq. Ft.: Per Soils Testing Report.
- j. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.
- k. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Per Soils Testing Report.

## 2.7 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Sphagnum Peat Mulch: Partially decomposed sphagnum peat moss, finely divided or of granular texture, and with a pH range of 3.4 to 4.8.
- C. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
  - 1. Organic Matter Content: 50 to 60 percent of dry weight.
  - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- D. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- E. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- F. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

## 2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

## 2.9 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.
- C. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 3-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Invisible Structures, Inc.; Slopetame 2.
    - b. Presto Products Company, a business of Alcoa; Geoweb.
    - c. Tenax Corporation - USA; Tenweb.

## 2.10 GRASS-PAVING MATERIALS

- A. Grass Paving: Cellular, non-biodegradable plastic mats, designed to contain small areas of soil and enhance the ability of turf to support vehicular and pedestrian traffic, of 2-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Grid Technologies, Inc.; Netlon 50.
    - b. Invisible Structures, Inc.; Grasspave2.
    - c. NDS, Inc.; Grassroad Paver8 Plus.
    - d. Presto Products Company, a business of Alcoa; Geoblock Porous Pavement System.
    - e. RK Manufacturing, Inc.; Grassy Pavers.
- B. Base Course: Sound crushed stone or gravel complying with Division 31 Section "Earth Moving" for base-course material.
- C. Sand: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.
- D. Proprietary Growing Mix: As submitted and acceptable to Architect.
- E. Sandy Loam Soil Mix: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate blended with planting soil as specified. Use blend consisting of 1/2 sand and 1/2 planting soil.
- F. Soil for Paving Fill: Planting soil as specified.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
  - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
  - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
  - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
  - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

### 3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
  - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
  - 1. Apply fertilizer directly to subgrade before loosening.
  - 2. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
    - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    - b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 4 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
    - a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
    - b. Reduce elevation of planting soil to allow for soil thickness of sod.
  - C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
    1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
    2. Loosen surface soil to a depth of at least 6 inches.
    3. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
      - a. Apply fertilizer directly to surface soil before loosening.
    4. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
    5. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
  - D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
  - E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
  - F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- 3.4 PREPARATION FOR EROSION-CONTROL MATERIALS
- A. Prepare area as specified in "Turf Area Preparation" Article.
  - B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
  - C. Fill cells of erosion-control mat with planting soil and compact before planting.
  - D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
  - E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

### 3.5 PREPARATION FOR GRASS-PAVING MATERIALS

- A. Reduce subgrade elevation soil to allow for thickness of grass-paving system. Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade so that installed paving is within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions.
- B. Install base course and sandy loam soil mix as recommended by paving-material manufacturer for site conditions; comply with details shown on Drawings. Compact according to paving-material manufacturer's written instructions.
- C. Install paving mat and fasten according to paving-material manufacturer's written instructions.
- D. Before planting, fill cells of paving mat with sandy loam soil mix and compact according to manufacturer's written instructions.
- E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

### 3.6 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
  - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
  - 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate 6 to 8 lb/1000 sq. ft.
- C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:4 with erosion-control blankets and 1:6 with erosion-control fiber mesh installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.
- F. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
  - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
  - 2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft.. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

- G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 3/16 inch, and roll surface smooth.

### 3.7 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
  - 1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
  - 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.
  - 3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry coat at a rate so that mulch component is deposited at not less than 500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate. Apply slurry cover coat of fiber mulch (hydromulching) at a rate of 1000 lb/acre.

### 3.8 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
  - 1. Lay sod across angle of slopes exceeding 1:3.
  - 2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

### 3.9 TURF RENOVATION

- A. Renovate existing turf.
- B. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
  - 1. Reestablish turf where settlement or washouts occur or where minor regrading is required.

2. Install new planting soil as required.
- C. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
- D. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.
- E. Mow, dethatch, core aerate, and rake existing turf.
- F. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- G. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- H. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- I. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.
- J. Apply seed and protect with straw mulch or sod as required for new turf.
- K. Water newly planted areas and keep moist until new turf is established.

### 3.10 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
  1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
  2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
  3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches through required maintenance period.
  1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
  2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

3. Water sourcing is the responsibility of the contractor; unless arrangements are made with owner.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
  1. Mow Kentucky bluegrass, annual ryegrass, chewings red fescue to a height of 3 to 4 inches.
  2. Mow turf-type tall fescue to a height of 3 to 4 inches.
- D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.
  1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

### 3.11 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
  1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
  2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
  3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
  4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

### 3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

## **SECTION 329700 - VEGETATED ROOF ASSEMBLIES**

### **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. Continuous vegetated roof assemblies.
- B. Related Sections:
  - 1. Section 075423 "Thermoplastic Polyolefin (TPO) Roofing" for membrane roofing, roof insulation, and membrane roofing warranty.

#### **1.3 DEFINITIONS**

- A. Captured Water: Water that is retained in the drainage layer of a vegetated roof assembly after new water additions have ceased and that cannot escape the roof except through evaporation or plant transpiration.
- B. Finish Elevation: Elevation of finished growing-media surface of planting area.
- C. Planting Area: Areas to be planted.
- D. Plant, Plants, Plant Material: Vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- E. Growing Medium: Manufactured, lightweight soil mixture that promotes good growing conditions for specific varieties of plants.

#### **1.4 ACTION SUBMITTALS**

- A. Product Data: For each vegetated roof assembly and each component, including each growing medium.
- B. Shop Drawings: For vegetated roof assembly. Include roof plans, slopes, and drain locations; details of vegetated roof assembly accessories; depth of growing media; and attachments to other work.

- C. Samples for Verification: For each of the following components of vegetated roof assembly:
1. Growing Media: 1-pint (0.5-liter) volume of each growing medium, in sealed plastic bags labeled with content and source. Each Sample shall be typical of the lots of growing media to be furnished. Provide an accurate representation of texture and composition.
  2. Molded-Sheet Drainage Panels: 12 by 12 inches (300 by 300 mm).
  3. Root Barrier: 12 by 12 inches (300 by 300 mm).
  4. Soil Retainer: Manufacturer's standard size to verify configuration and color selected.

### **1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
1. Manufacturer's certified analysis of standard products.
  2. Analysis of other materials by a recognized laboratory, according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Product Test Reports: For each growing medium, including complete analysis demonstrating compliance with specified requirements.
- D. Field quality-control reports.
- E. Warranty: Sample of each special warranty.

### **1.6 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: Recommended maintenance plan including procedures for inspection and care of vegetated roof assembly and plants during a calendar year. Submit before start of required warranty and maintenance periods.

### **1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified vegetated roof assembly Installer, approved, authorized, or licensed by membrane roofing manufacturer, whose work has resulted in successful establishment of vegetated roofs.
1. Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

- B. Source Limitations: Obtain vegetated roof assembly components, growing medium, and accessories from single source from single manufacturer.
- C. Preinstallation Conference: Conduct conference at Project site.

### **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- B. Bulk Materials:
  - 1. Do not dump or store bulk materials on or near structures, utilities, walkways and pavements, or existing roof areas or plants.
  - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of debris-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
  - 3. Accompany each delivery of bulk materials with product certificates.

### **1.9 PROJECT CONDITIONS**

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

### **1.10 WARRANTIES**

- A. Special Warranty for Vegetated Roof Assembly: Installer agrees to repair or replace vegetated roof assembly and components that fail in materials or workmanship within specified warranty period.
  - 1. Failure includes, but is not limited to, ponding water or prolonged wetness of growing medium caused as a result of failure of the assembly to properly drain.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty for Plant Growth: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
  - 1. Foliage Cover: Planted materials shall grow to achieve and maintain at least 80 percent foliage cover over planting area commencing 24 months after planting, through the duration of this warranty.

2. Failures include, but are not limited to, death and unsatisfactory growth except for defects resulting from abuse, lack of adequate maintenance, neglect by Owner, or incidents that are beyond Contractor's control.
3. Warranty Periods from Date of Substantial Completion:
  - a. Trees and Shrubs: Two years.
  - b. Ground Covers, Perennials, Vines, and Ornamental Grasses: Two years.
4. Include the following remedial actions as a minimum:
  - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
  - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
  - c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
5. Provide extended warranty for period equal to original warranty period, for replaced plant material.

### **1.11 MAINTENANCE SERVICE**

- A. Initial Maintenance Service: Provide maintenance by skilled employees of vegetated roof assembly Installer approved by membrane roofing manufacturer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than the following maintenance period:
  1. Maintenance Period: 12 months from date of Substantial Completion.
- B. Continuing Maintenance Proposal: From vegetated roof assembly Installer approved by membrane roofing manufacturer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

## **PART 2 - PRODUCTS**

### **2.1 VEGETATED ROOF ASSEMBLY COMPONENTS**

- A. Moisture-Retention and Drainage Products:
  1. Molded-Sheet Drainage Panels: Manufacturer's standard drainage board formed from geotextile-faced, molded-plastic sheet with a geotextile face and "cups" of the molded sheet facing upward like small reservoirs to retain water while allowing excess water to drain away below the board.

- B. Root Barrier: Manufacturer's standard black plastic sheet manufactured from polyethylene or polypropylene plastic; formulated to resist root growth and bacteria.

## 2.2 VEGETATED ROOF ASSEMBLIES

- A. Continuous Vegetated Roof Assembly: Continuous-coverage assembly consisting of manufacturer's standard vegetated roof assembly components for installation over membrane roofing.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. American Hydrotech, Inc; Intensive Garden Roof.
    - b. Carlisle SynTec Incorporated; Deep Assembly Roof Garden.
    - c. Dow Chemical Company (The); GardenTop Intensive System.
    - d. Firestone Building Products; SkyScape Multilayer System.
    - e. Henry Company; 790-11 Green Roof System for Intensive Vegetation.
    - f. Sika Sarnafil.
  - 2. Assembly Depth, Nominal: Manufacturer's standard for required plantings, including growing medium, but not less than 12 inches.
  - 3. Assembly Weight: Maximum 28 lb/sq. ft. (137 kg/sq. m), including growing medium and plants except for large perennials and trees and saturated with captured water, but not including weight of roofing system.
  - 4. Plantings: As shown on Drawings.

## 2.3 MANUFACTURED GROWING MEDIA

- A. Growing Medium: Vegetated roof assembly manufacturer's lightweight, manufactured soil mixture designed for plants indicated on Drawings.
  - 1. General Condition at Time of Planting: Free of stones 1/2 inch (13 mm) or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of weeds and other botanical pests; not infested with nematodes, grubs, or other pests or pest eggs; free of disease-causing plant pathogens and other undesirable organisms; friable and with sufficient structure to give good tilth and aeration.

## 2.4 ACCESSORIES

- A. Soil Retainer: Assembly manufacturer's polyethylene or vinyl, extruded-aluminum, or formed stainless-steel edging with drainage openings.
  - 1. Configuration: L-shaped or T-shaped.

2. Color: Black or Mill-finish metal.
3. Method of Attachment: Manufacturer's standard adhesive compatible with the membrane roofing.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine each area to receive vegetated roof assembly for compliance with requirements for installation tolerances and other conditions affecting performance.
  1. Verify that perimeter and other flashings are in place and secure along entire lengths where they will be covered by vegetated roof assembly.
- B. Flood Testing: Flood test each deck area for leaks, according to recommendations in ASTM D 5957, after completing and protecting membrane roofing but before placing overlaying construction. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
  1. Flood to an average depth of 2-1/2 inches (65 mm),) with a minimum depth of 1 inch (25 mm) and a maximum depth of 4 inches (100 mm). Maintain 2 inches (50 mm) of clearance from top of sheet flashings.
  2. Flood each area for 48 hours.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. Inspect growing medium. If growing medium is contaminated by foreign or deleterious material or liquid, remove growing medium and contamination and replace with new growing medium.

#### **3.2 PREPARATION**

- A. General: Protect structures, utilities, sidewalks, pavements, and other facilities and areas from damage caused by installation.
- B. Protection Course: Cover membrane roofing with protection board with butted and fully taped joints before membrane roofing is subject to vegetated roof assembly installation work.

#### **3.3 INSTALLATION, GENERAL**

- A. Install vegetated roof assembly according to manufacturer's written instructions.
- B. Sloped Roofs: Install 1/4 inch per 12 inches (1:48) according to manufacturer's written instructions.

- C. Small Plant Stabilization: Install over planting area to secure small plants according to manufacturer's written instructions.

### **3.4 PLANTING**

- A. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in growing medium within a planting area.
- B. Do not mix or place growing medium during frozen, wet, or muddy conditions.
- C. Suspend spreading, grading, and planting operations during periods of excessive moisture until the moisture content in growing medium reaches acceptable levels to attain the required results.
- D. Uniformly moisten an excessively dry growing medium that is too dusty or not workable.

### **3.5 SOIL-RETAINER INSTALLATION**

- A. Install soil retainer where indicated according to manufacturer's written instructions. Secure with adhesive.

### **3.6 FIELD QUALITY CONTROL**

- A. Manufacturer's Field Service: Engage membrane roofing manufacturer's authorized service representative to provide full-time inspection of vegetated roof assembly installation and prepare inspection reports.
- B. Correct deficiencies in work that do not comply with requirements.

### **3.7 PLANT MAINTENANCE**

- A. General: During maintenance period, maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing devices, resetting plants to proper elevations or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Replace growing medium that becomes displaced or eroded because of settling or other processes.
- C. Apply treatments as required to keep plant materials, planted areas, and growing medium free of pests and pathogens or disease. Use integrated pest management

practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

- D. Use only products and methods acceptable to membrane roofing manufacturer.

### **3.8 CLEANING AND PROTECTION**

- A. During planting and maintenance, keep adjacent areas and construction clean and maintain work area in an orderly condition.
- B. Protect vegetated roof assemblies from damage due to planting operations and operations of other contractors and trades. Repair or replace damaged vegetated roof assemblies.

**END OF SECTION 329700**

Scope: Design, Engineer, and Construct:

**10'Wx100'L Combination Span Timber Bridge**

**Requirements:**

1. Bridge to be built by York Bridge Concepts or approved equal, meeting or exceeding below specifications, based on the conceptual drawings provided. The timber bridge is to be designed and built following the design intent indicated by the conceptual drawings provided. Contact John York @ York Bridge Concepts: 1-800-226-4178, EXT 127. johnyork@YBC.com
1. Awarded bridge contractor, at the time of design and engineering, shall provide shop drawings with engineering calculations to verify structural integrity, sizing, verification and loading capacity of design. A professional engineer licensed in the state of Ohio will seal all drawings and calculations to support sizing of structural components and required load handling.
2. Bridge contractor will provide a 3-year structural warranty. Bidder must provide a written copy, with maintenance requirements that supports the 3 – year warranty, with bid submittal.
3. Bridge contractor will clean up each work site daily, placing scraps in a dumpster to be furnished and removed by the bridge contractor.
4. Bridge contractor to provide a system to catch all shavings, dust, and cutoffs before they enter the environmentally sensitive areas to every extent possible. Any that enter the environmentally sensitive areas will be cleaned up immediately. A plan will be submitted in writing to the owner.
5. General contractor is responsible for posting load limit signs and/or barriers at each end of each bridge.
6. General contractor is required to inspect and sign off on each bridge and/or site both before and after construction.
7. It is the responsibility of the owner to provide soils report, hydraulic report with flow characteristics and scour potential. If this information is provided with bid documents then this information should be incorporated in the lump sum price by bridge contractor. If the hydraulic report with flow characteristics and scour potential is not provided then the winning bridge contractor and engineer of record are to prescribe and note on the engineered drawings and calculations the necessary measures for potential scour, if at all present. If any or all of this information is supplied after the bid opening, then the bridge contractor awarded the project can submit through a change order any costs for upgrades to the bridge design if necessary.

**Minimum Material Requirements**

**A. Loading Requirements**

1. Pile-supported Pedestrian bridges and Boardwalks shall be designed for a minimum uniform live load of 85 pounds per square foot live load. Bridges shall be designed with the appropriate dead load and a minimum deflection of L/360.

**B. Lumber and Treatments**

1. All sawn lumber shall be Southern Yellow Pine no. 1 grade and shall be graded under the Southern Pine Inspection Bureau (SPIB) rules.
2. All treatments must meet or exceed the standards for treated wood set by the AWPA.
3. All pile foundations and substructure shall be treated with CCA water based treatment.

**D. Wood Decking**

1. Wood decking for the boardwalk bridges shall be preservative treated Southern Pine with a minimum allowable extreme fiber stress in bending of 1200 PSI and minimum modules of elasticity of 1,600,000 PSI.
2. Decking to be 2" X 8" and fastened with stainless steel screws or better. All screws will be recessed a minimum of 1/2" below deck surface.
3. Decking to be minimum #1 grade lumber.

**E. Timber Pilings**

1. All pilings for timber abutment shall meet the requirements as set forth by the American Society for Testing and Materials (ASTM) under the provisions of D25 (latest edition), standard specifications for round timber piles. Final size and number of piles to be designed based on the soils and hydraulic report.
2. Hand auguring and/or water jetting are not permitted for piling installation on this project.
3. All bridge pilings shall be driven. Bridge contractor's structural engineer shall approve all required depths and any piles not driven to required depth. A minimum capacity per pile is to be established by the bridge contractor's structural engineer.
4. All pile driving should be from deck level where necessary.
5. Piles shall be minimum 8" butt and up to 12" butt and driven a minimum 8' in the ground and up to 20' and or refusal.

**F. Structural Steel and Other Metals**

1. After fabrication, all bolts, plates, angles and brackets (steel shapes) shall be hot dipped galvanized per A.A.S.H.T.O. specification M-111 and sized accordingly. Flow rates and other information supplied by owner's civil engineer should be taken into consideration on sizing.
2. All welding of angles, plates and plates to be per A.W.S. specifications.
3. All hardware to be dual coated with a primer and either galvanized or gloss black paint after galvanizing.
4. Stainless steel components should be used where applicable.

**G. Abutments**

1. The boardwalk bridge shall have a standard timber abutment at each end a minimum of 3' in height with wing walls at each side of the abutment. Abutments wing walls are to extend a minimum of 5' beyond each side and end at a 45° angle.
2. Concrete abutments can be utilized for this project.

**H. Handrail**

1. A minimum 42" high timber pedestrian guiderail must be installed. Guiderail should be designed to withstand a lateral force of 75 PLF.
2. Handrail to have no openings greater than 4".
3. Handrail material to be #1 grade.
4. Bridge designer to provide final design of guiderail through shop drawings and structural calculations for all components of bridge and of guiderail and guiderail loading.

**I. Maintenance**

1. Bridge contractor will complete the bridge and then return to the bridge approximately 4-6 months after completion.
2. Upon returning to the bridge, bridge contractor will perform an inspection of the boardwalk and submit a report to the owner.
3. Make any adjustments necessary as follows, but not limited to, tighten all the fasteners/bolts, check decking for warped or badly checked boards, replace any

decking or handrail boards that are not adequate, set deck fasteners, straighten align hand rails and sand or grind any areas.

#### J. Protectant Coatings

1. Bridge contractor will complete the bridge and then return to the bridge approximately 4-6 months after completion to apply coatings.
2. Upon returning to the bridge, wash, clean, pressure wash and prep the boardwalk for sealant application.
3. Bridge contractor shall take all appropriate environmental protection measures necessary to protect the environment during the application of the sealant. Such as tarps, visqueen, wind barriers, over spray protection and whatever measures necessary to protect the environment.
4. Bridge contractor shall apply Sikkens Cetol SRD Semi-Transparent Stain coating package to all visible surfaces of the outside stringers, exposed piles caps, all piles, and bracing. Bridge contractor shall apply a 3-step UV protectant coating package to all visible surfaces of the railing system. These applications shall include supply of all materials and labor - complete. The three-step process must include:

Step 1: Pressure washing, clean with approved cleaner and preparation of all parts to be sealed.

Step 2: Application of 1 primer coat to all parts receiving sealant

Step 3: Application of 2 base coats of product in owner's choice of colors.

(Contractor to provide owner with a color pallet designating each area of the bridge)

5. *Application must be in accordance with **all** manufacturer recommendations, including, but not limited to:*
  - a. Bridge contractor must install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Product should not be installed if it is raining or snowing or if such conditions appear to be imminent. Minimal application temperature of 50 degrees F required, with surface temperature of no more than 90 degrees F. Consult Material Safety Data Sheets created by manufacturer of product for complete handling recommendations.
  - b. Product shall be applied to horizontal surfaces with a roller or painter pad; product shall be applied to vertical surfaces with a roller or paint pad or sprayer if desired. ***Overspray must be eliminated to the extent possible.***
  - c. Bridge contractor must condition the specified product as recommended by the manufacturer.
  - d. Bridge contractor shall prepare surface as recommended by manufacturer which should include thoroughly pressure washing the surfaces to be treated. New wood surfaces have a mill glaze that prevents maximum penetration of the sealant; therefore, even newly installed bridges will require this prep step.
  - e. Bridge contractor shall clean-up work site daily and upon completion of project, including proper disposal of all materials.
6. Materials must meet the following criteria in order to be accepted for this project:
  - i. Professional, premium commercial quality Sikkens Cetol SRD Semi-Transparent Stain and polymer coatings should be used. Sealants primarily marketed and/or designed for homeowners (such as Thompson's Water Seal™, Cabot™, or Olympic™ products) ***will not be accepted.***
  - ii. Sealant must be pigmented. Clear sealants will not be accepted for this project. Water repellents alone will not be accepted for this project.

- iii. The multi-step sealant system must be climate specific and recommended for the climate in which it will be applied.
- iv. Base Coat must meet or exceed the following performance criteria:
  - Acrylic or polymer Blend
  - Weight/gallon 8.52lb / gallon or better
  - Flash point greater than 200 degrees F
  - VOC: 200 g/L or better

**K. Textured Polymer Deck Coating**

1. Upon returning to the bridge, the bridge contractor will apply Kiwi Grip Non-Skid Deck Coating to the deck of the bridge.
2. Kiwi Grip Non-Skid Deck Coating to be non-toxic, low VOC-free water based product.
3. Kiwi Grip Non-Skid Deck Coating application will include deck preparation necessary, 1 application of a primer, application of primer between exposed deck board edges, 2 applications of the Kiwi Grip Non-Skid Deck Coating and 1 final application of acrylic clear coat.
4. Bridge contractor shall take all appropriate environmental protection measures necessary to protect the environment during the application of the TPC. Such as tarps, visqueen, wind barriers, over spray protection and whatever measures necessary to protect the environment.

Similar or Equal to:

**L. Project Submittals Required of Bridge Contractor**

1. Wood preservative treatment certification from the treating facility will be provided.
2. Engineering specifications, engineered calculations, and engineered construction shop drawings shall be provided detailing, verifying and/or sizing each individual component. The above must contain an embossed seal by a professional engineer who is registered in the state where the work will be performed.
3. Specifications for pile-driving equipment and methods, including hammer calculations verifying capacity to drive the piling to required tonnage and criteria for verification of pile capacity.