

THE BANKS - PHASE 3B

PUBLIC INFRASTRUCTURE DEVELOPMENT
PARKING GARAGE AND STREET GRID

LOT 23/27 GARAGE & RACE ST. TURNAROUND

Bid Package 6 (ITB # 016-20)

**Lot 23 Park, Lot 23/27 Garage Signage and
Security**

February 21, 2019

BOARD OF COMMISSIONERS
OF HAMILTON COUNTY, OHIO

and

CITY OF CINCINNATI, OHIO

THP Limited: Architect/Structural Engineer

Kleingers: Landscape Architect

Heapy Engineering: MEP/FP Engineer

Bright Technologies: Security

Kolar Design: Signage

Burgess & Niple: Civil Engineer

McGill Smith Punshon: Surveyor

Terracon Consultants: Geotechnical Engineer

Messer/MBJ Consultants: Construction Manager

SECTION 000110
PROJECT MANUAL INDEX

Introductory Pages

Section	000110	Project Manual Index
	000115	Drawing Index
	000125	Project Directory

Bidding Requirements, Contract Forms, and Conditions of the Contract

Section	001000	Bidding Documents
	001000.1	Advertisement for Bids (Legal Notice)
	001000.2	Instructions to Bidders – AIA A701
	001000.3	Additional Bid Conditions
	001000.4	Bid Form
	001000.5	Bid Guaranty and Contract Bond
	001000.6	Certificate of Compliance, Ohio Department of Insurance
	001000.7	Non-Collusion Affidavit of Contractor
	001000.8	Bidder's Certification Concerning Equal Employment Opportunity Requirements
	001000.9	Personal Property Tax Statement
	001000.10	Subcontractor and Material Supplier List
	001000.11	The Banks Project SBE Program Summary
	001000.12	Subcontractor Utilization Plan – (Form 2003)
	001000.13	Statement of Good Faith Efforts – (Form 2007)
	001000.14	Outreach/Good Faith Summary Sheet – (Form 2007-a)
	001000.15	Warranty Against an Unresolved Finding For Recovery
	001000.16	Homeland Security Declaration
	001000.17	Responsible Bidder Certification
	001000.18	Tax Statement Sheet
	001000.19	Not Used
	001000.20	Not Used
	001000.21	Certified Check Form
	001000.22	Registration Form
	001000.23	Prevailing Wages and Prevailing Wage Rate Tables
	005000	Agreement Form
	006100	Contract Bond
	006150	Escrow Agreement
	007200	General Conditions
	008100	Project Safety Program
	008260	Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development
	008270	Responsible Bidder Requirements
	009000	Contract Forms

Division 01 - General Requirements

Section	011100	Summary of Work
	012100	Allowances
	012513	Product Substitution Procedures
	013100	Project Coordination
	013119	Project Meetings
	013216	Construction Progress Schedule
	013226	Construction Progress Reporting
	013300	Submittals
	013323	Shop Drawings, Product Data, and Samples
	013543	Environmental Procedures
	014000	Quality Requirements
	014216	Definitions, Standards, and Regulatory Requirements
	015000	Construction Facilities and Temporary Controls
	017329	Cutting and Patching
	017700	Closeout Procedures and Submittals

Technical Specifications:

Division 02 – Existing Conditions

Section	024100	Demolition
---------	--------	------------

Division 03 – Concrete

Section	030100	Concrete Repairs
	033000	Cast-in-Place Concrete

Division 04 – Masonry

Section	044213	Exterior Stone Cladding
	044302	Granite

Division 05 – Metals

Section	055000	Metal Fabrications
	057000	Ornamental Metals

Division 07 – Thermal and Moisture Protection

Section	071400	Fluid Applied Waterproofing
	079000	Expansion Joints
	079200	Sealants

Division 12 - Furnishings

Section	129300	Site Furnishings
---------	--------	------------------

Division 22 – Plumbing

Common Work Results For Plumbing

Section	220501	Basic Plumbing Requirements
	220502	Agreement and Waiver for Use of Electronic Files
	220502A	Electronic Files Heavy Release Form to Contractors
	220504	Basic Plumbing Materials and Methods
	220505	Firestopping
	220507	Piping Materials and Methods

220517	Expansion Loops For Plumbing Systems
220523	General Duty Valves For Plumbing Piping
220529	Hangers and Supports For Plumbing Piping
220553	Identification of Plumbing Piping

Plumbing Piping

Section	221116	Interior Domestic Water Piping
	221119	Interior Domestic Water Piping Specialties

Facility Sanitary Sewerage

Section	221316	Interior Drainage and Vent Systems
	221319	Drainage Systems Specialties

Division 26 – Electrical

Common Work Results For Electrical

Section	260501	Basic Electrical Requirements
	260502	Agreement and Waiver For Use of Electronic Files
	260502A	Electronic Files – Heapy Release Form to Contractors
	260504	Basic Electrical Materials and Methods
	260505	Firestopping
	260519	Low-Voltage Electrical Power Conductors - Copper
	260526	Grounding and Bonding For Electrical Systems
	260533	Raceways and Boxes For Electrical Systems
	260553	Identification For Electrical Systems
	260565	Specific Wiring Applications
	260923	Lighting Control Devices

Low-Voltage Electrical Transmission

Section	262213	Distribution Transformers
	262413	Distribution Switchboards
	262416	Panelboards
	262716	Electrical Cabinets and Enclosures
	262726	Wiring Devices and Coverplates
	262813	Fuses
	262816	Disconnect Switches
	262913	Motor Controllers

Lighting

Section	265113	Interior Luminaires, Lamps and Ballasts
	265114	Lighting Control Panels
	265200	Exit and Emergency Lighting
	265600	Exterior Lighting

Division 27 – Communications

Section	270528	Pathways for Communications Systems
	270544	Sleeves and Sleeve Seals for Communications Pathways and Cabling
	271500	Communications Horizontal Cabling

Division 28 – Electronic Safety and Security

Section	280513	Conductors and Cables for Electronic Safety and Security
	280528	Pathways for Electronic Safety and Security
	280544	Sleeves and Sleeve Seals for Electronic Safety and Security
		Pathways and Cabling
	282300	Video Surveillance
	282400	Emergency Telephone Equipment
	282450	Alarm Annunciation and Remote Notification Equipment

Division 32 – Exterior Improvements

Section	321440	Granit Unit Paving
	321813	Synthetic Turf
	328400	Irrigation
	329113	Planting Soils
	329113.23	Structural Soils
	329200	Turf & Grasses
	329300	Plants

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Lot 27 Music Venue Specifications by GBBN:

Section	055213	Pipe and Tube Railings
	055214	Exterior Cable Rail System
	071000	Waterproofing
	079500	Expansion Control
	321313	Concrete Paving
	331100	Water Utility Distribution

END OF SECTION

SECTION 000115

DRAWING INDEX

DRAWING TITLE

TITLE SHEET

SURVEY

TOPOGRAPHIC SURVEY - LOWER LEVEL - SOUTH

TOPOGRAPHIC SURVEY - PODIUM LEVEL

GENERAL

G001 BUILDING CODE NOTES

G002 BUILDING CODE DIAGRAM

G004 UPPER LEVEL/PARK EGRESS PLAN

CIVIL

C101 SITE PLAN

ARCHITECTURE

A103 OVERALL PODIUM LEVEL (515) PLAN

A102B PARK LEVEL (503) PLAN - LOT 23 (FOR REFERENCE ONLY)

A102B-P PARK LEVEL (503-507) LAYOUT, MATERIALS & GRADING PLAN

A103B PODIUM LEVEL (515) PLAN - LOT 23

A110 ENLARGED PARK PLANS

A111 ENLARGED PARK PLANS

A112 PARK SECTIONS

A113 PARK SECTIONS

A114 RAILING DETAILS

A115 PAVING DETAILS

A116 DONOR WALL REPLACEMENT DETAILS

A117 DONOR WALL REPLACEMENT DETAILS

A120 LOT 22 RAMP

A121 RAMP AND DEMOLITION SECTIONS

A250 LOT 23 STAIR & ELEVATOR - PLANS

A251 LOT 23 STAIR & ELEVATOR - SECTIONS

A252 LOT 23 STAIR & ELEVATOR - ELEVATIONS

A270 LOWER RACE STREET STAIRS AND PLANTER

A271 LOWER RACE STREET STAIRS AND PLANTER DETAILS

A280 LOT 23 NORTHWEST CORNER - PLAN

A290 UPPER RACE STREET STAIRS & PLANTERS

A291 UPPER RACE STREET STAIRS & PLANTERS - SECTIONS

A292 UPPER RACE STREET STAIRS & PLANTERS - SECTIONS

A293 UPPER RACE STREET PAVING AND RAILING DETAILS

LANDSCAPE

L100 HARDSCAPE PLAN
L101 HARDSCAPE ENLARGEMENT PLAN
L102 HARDSCAPE ENLARGEMENT PLAN
L103 HARDSCAPE DETAILS
L200 LANDSCAPE SOILS PLAN
L300 LANDSCAPE PLAN
L301 PLANT SCHEDULE & DETAILS
L400 DETAILS
L401 DETAILS

IRRIGATION

IR100 IRRIGATION PLAN
IR101 IRRIGATION NOTES & DETAILS

STRUCTURAL

S001 GENERAL NOTES (FOR REFERENCE ONLY)
S002 TYPICAL DETAILS (FOR REFERENCE ONLY)

S102B PARK LEVEL (503) FRAMING PLAN - LOT 23 (FOR REFERENCE ONLY)
S103B PODIUM LEVEL (515) FRAMING PLAN - LOT 23 (FOR REFERENCE ONLY)

S401 FRAMING DETAILS (FOR REFERENCE ONLY)
S402 FRAMING DETAILS (FOR REFERENCE ONLY)
S403 FRAMING DETAILS (FOR REFERENCE ONLY)

PLUMBING

P001BP LEGEND & INDEX
P002BP SCHEDULES, DETAILS AND NOTES
P101BP LOWER LEVEL PLUMBING PLAN (LOT 23)
P102BP UPPER LEVEL PARK PLAN - LOT 23
P103BP PODIUM LEVEL PLAN - LOT 23
P105 CAROUSEL ROOF DRAIN PIPING (LOT 22) (FOR REFERENCE ONLY)

ELECTRICAL

E001 ELECTRICAL LEGEND
E002 SCHEDULES
E003 PANELBOARDS
E004 SINGLE-LINE DIAGRAM
E005 DETAILS
E200 ENTRANCE LEVEL LIGHTING PLAN
E201 PARK LEVEL LIGHTING PLAN
E202 RACE STREET STAIR LIGHTING PLAN
E300 LOWER LEVEL POWER PLAN LOT 23
E301 LOWER LEVEL POWER PLAN LOT 27
E302 PARK LEVEL POWER PLAN

WATERPROOFING

SW102BPARK LEVEL (503-507) WATERPROOFING PLAN

SW103BPODIUM LEVEL (515) AND PARK LEVEL (503) WATERPROOFING PLAN

SW201 WATERPROOFING SECTIONS

SW202 WATERPROOFING SECTIONS

SW203 WATERPROOFING SECTIONS

SW301 WATERPROOFING DETAILS

SW302 WATERPROOFING DETAILS

SW303 WATERPROOFING DETAILS

RACE STREET

C100 SCHEMATIC PLAN

C200 GENERAL NOTES

C300 TYPICAL SECTIONS

C400 CUL-DE-SAC DETAILS

C401 TEMPORARY RAILING PLAN

C500 JOINT LAYOUT PLAN

C501 OVERLAY SLAB ELEVATIONS

C700 JOINT DETAILS (FOR REFERENCE ONLY)

SIGNAGE

SG101A WAYFINDING SIGNAGE - LOWER LEVEL (489) - P2 LEVEL - LOT 27

SG101B WAYFINDING SIGNAGE - LOWER LEVEL (489) - P2 LEVEL - LOT 23

SG102A WAYFINDING SIGNAGE - PARK LEVEL (503) - P1 LEVEL - LOT 27

SG102B WAYFINDING SIGNAGE - PARK LEVEL (503) - P1 LEVEL - LOT 23

SG103A WAYFINDING SIGNAGE - PODIUM LEVEL (515) - PL LEVEL

SG200 101400 SPECIFICATIONS - IDENTIFYING DEVICES

SG201 SIGNAGE COLORS SPECIFICATIONS

SG202 SIGN TYPES A, B & C

SG203 SIGN TYPES D, E, F, G & O

SG204 SIGN TYPES H, I, J & K

SG205 SIGN TYPES L, M, N & R1

SG206 SIGN TYPE Q - GARAGE ENTRANCES

SG207 SIGN TYPES R2, CC & U

SG208 SIGN TYPE S

SG301 LOCATION ELEVATION - ELEVATOR

SG401 MESSAGE SCHEDULE

SECURITY

TY001 DRAWING INDEX, LEGEND, NOTES, AND ABBREVIATIONS
TY101A LOT 27 LOWER LEVEL SECURITY SYSTEMS PLAN (489)
TY101B LOT 23 LOWER LEVEL SECURITY SYSTEMS PLAN (489)
TY101C LOT 24 LOWER LEVEL SECURITY SYSTEMS PLAN (489)
TY102A LOT 27 UPPER LEVEL SECURITY SYSTEMS PLAN (503)
TY102B LOT 27 UPPER LEVEL SECURITY SYSTEMS PLAN (503)
TY102C LOT 27 UPPER LEVEL SECURITY SYSTEMS PLAN (503)
TY103A LOT 24 PODIUM LEVEL SECURITY SYSTEMS PLAN (515)
TY501 NETWORK ENCLOSURE DETAILS
TY502 CCTV AND TELEPHONE ENCLOSURE MOUNTING DETAILS
TY601 SECURITY EQUIPMENT SCHEDULE
TY901 NETWORK SCHEMATIC DIAGRAMS
TY902 TELEPHONE RISER DIAGRAMS

MUSIC VENUE (LOT 27) RELATED WORK

A504 WATERPROOFING/EXPANSION JOINT PLANS AND DETAILS
C200 GENERAL NOTES AND DETAILS
C400 SITE PLAN
C500 GRADING AND UTILITY WORK

END OF SECTION

SECTION 000125

PROJECT DIRECTORY

Owner - Garage
Board of County Commissioners of
Hamilton County, Ohio
County Administration Building, Room 603
138 East Court Street
Cincinnati, Ohio 45202

Owner – Park
City of Cincinnati
801 Plum Street
Cincinnati, Ohio 45202

Architect/Structural Engineer
THP Limited, Inc.
100 East Eighth Street
Cincinnati, Ohio 45202
Phone 513-241-3222

Construction Manager
Messer Construction /MBJ Consultants Inc.
643 West Court Street
Cincinnati, Ohio 45203
Phone 513-242-1541

Landscape Architect
The Kleingers Group
6219 Centre Park Drive
West Chester, Ohio 45069
Phone: 513-779-7851

Signage Consultant
Kolar Design, Inc.
807 Broadway Street
Cincinnati, Ohio 45202
Phone: 513-241-4884

MEP & FP Engineer
Heapy Engineering LLC
1400 West Dorothy Lane
Dayton, Ohio 45409
Phone 937-224-0861

Security Consultant
Bright Technologies, Inc.
25086 Legion Road
Sunman, Indiana 47041
Phone: 812-623-0044

Civil Engineer
Burgess & Niple
525 Vine Street
Cincinnati, Ohio 45202
Phone 513-579-0042

END OF SECTION

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

SECTION 001000
BID SUBMISSION DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

1. Advertisement For Bids (Legal Notice) – Document 001000.1
2. Instructions to Bidders – AIA A701 as amended and modified – Document 001000.2
3. Additional Bid Conditions – Document 001000.3
4. Bid Form – Document 001000.4
5. Bid Guaranty And Contract Bond – Document 001000.5
6. Certificate of Compliance, Ohio Department of Insurance – Document 001000.6
7. Non-Collusion Affidavit Of Contractor – Document 001000.7
8. Bidder's Certification Concerning Equal Employment Opportunity Requirements – Document 001000.8
9. Personal Property Tax Statement – Document 001000.9
10. Subcontractor and Material Supplier List – Document 001000.10
11. The Banks Project SBE Program Summary – Document 001000.11
12. Subcontractor Utilization Plan – (Form 2003) – Document 001000.12
13. Statement of Good Faith Efforts – (Form 2007) – Document 001000.13
14. Outreach/Good Faith Summary Sheet – (Form 2007-a) – Document 001000.14
15. Warranty Against An Unresolved Finding For Recovery – Document 001000.15
16. Homeland Security Declaration – Document 001000.16
17. Responsible Bidder Certification – Document 001000.17
18. Tax Statement Sheet – Document 001000.18
19. Not Used
20. Not Used
21. Certified Check Form – Document 001000.21
22. Registration Form – Document 001000.22
23. Prevailing Wages – Document 001000.23

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END

The Banks – Lot 23 Park,
Lot 23/27 Garage Signage & Security
Bid Package No #6 – February 25, 2020

Document 001000.1 ADVERTISEMENT FOR BIDS (LEGAL NOTICE)

Sealed bids will be received by the Board of County Commissioners of Hamilton County, Ohio in Room 507 of the County Administration Building, 138 East Court Street, Cincinnati, Ohio until **11:00 A.M., Local Time, March 18, 2020** for furnishing labor, materials, tools, equipment and services necessary for:

ITB 016-20 - THE BANKS – Lot 23 Park
Lot 23/27 Garage Signage & Security - Bid Package #6
TC09 - Lot 23 Park and TC10 - General Trades, Security & Signage

A PRE-BID CONFERENCE WILL BE HELD ON MARCH 5, 2020 at 10:00AM,
138 EAST COURT STREET (ROOM 605) CINCINNATI, OH 45202

Questions: March 10, 2020 by 12:00 PM

Answers: March 12, 2020 by end of business day

This is a prevailing wage project, and the estimated budget is **\$8,834,064 – General Construction**. Proposal Forms, specifications, etc. may be obtained upon application at ARC, 7157 E. Kemper Road, Cincinnati, Ohio 45241 or they may be electronically retrieved by accessing the following website – <http://www.hamilton-co.org/purchasing/>.

Owner – Parking Garage
Hamilton County
County Administration Building, Room 603
138 East Court Street
Cincinnati, Ohio 45202
Phone: 513-946-4400

Owner – Race Street and Public Utilities
City of Cincinnati
801 Plum Street
Cincinnati, Ohio 45202

Architect/Engineer for the Project:
THP Limited, Inc.
100 East Eighth Street
Cincinnati, Ohio 45202
Phone: 513-241-3222

Surveyor:
McGill Smith Punshon
3700 Park 42 Drive, Suite 190B
Cincinnati, Ohio 45241
513-759-0004

Civil Engineer for the Project:
Burgess and Niple, Inc.
312 Plum Street, 12th Floor
Cincinnati, Ohio 45202
513- 579-0042

Construction Manager for the Project:
Messer Construction Co. / MJB Consultants Inc.
643 West Court Street
Cincinnati, Ohio 45203
513-242-1541

Bidding Documents may be examined at:

Allied Construction Industries
3 Kovac Drive
Cincinnati, Ohio 45215
513-221-8020

Hamilton Co. Purchasing
www.Hamilton-Co.org
See Auctions/Bid/Vendors
Select Bids/RFPs/RFQs or www.bidsync.com

Cincinnati Minority Contractors
3 Kovac Drive
Cincinnati, Ohio 45215
513-631-7666

McGraw Hill Construction Dodge
7265 Kenwood Rd., Suite 200
Cincinnati, Ohio 45236
513-345-8200

South Central Ohio Minority
Business Council
441 Vine Street Suite 300
Cincinnati, Ohio 45202
513-579-3104

Greater Cincinnati Northern Kentucky
African American Chamber of Commerce
2945 Gilbert Avenue
Cincinnati, Ohio 45206
513-751-9900

Reed Construction Data
www.reedconstructiondata.com

Bidding Documents will also be available on SCAN, a subscription microfilm service of Dodge/McGraw-Hill Information Systems.

Starting **February 25, 2020** prime bidders and bidders other than prime bidders may purchase Plans, Specifications, and Proposal Forms by electronically retrieved by accessing the following web site – <http://www.hamilton-co.org/purchasing/>.

All Prime Bidders MUST register with Hamilton County Purchasing for this project through BidSync in order to receive addenda or other communications to bidders. When purchasing Bidding Documents, prime bidders shall identify themselves as legitimate prime bidders by means of company stationary or business cards. Documents will not be issued on a deposit basis, and will not be available for purchase from the Engineer or Hamilton County.

Prime bidders are cautioned that addenda will be sent to all bidders who have registered. The Engineer, the Construction Manager, Development Manager and Hamilton County will not be responsible for sending addenda to prime bidders who have not registered.

As bid security, Bidders shall submit with their bid a Bid Guaranty in the form of either (1) a combined Guaranty and Contract Bond, or (2) a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit. If a Bid Guaranty and Contract Bond is submitted with the Bid, it shall be for the full amount of Bidder's bid, including alternates. If a certified check, cashier's check or irrevocable letter of credit shall be in the amount of 10% of the bid amount including Base Bid and Alternates. If a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit is submitted, it shall be payable to the Board of County Commissioners of Hamilton County, Ohio, the City of Cincinnati, Ohio, and Messer Construction Co. The Bid Guaranty, in either form, must be in strict compliance with Section 153.54 of the Ohio Revised Code, and also Sections 153.57 or 153.571, as applicable. **The Board of County Commissioners of Hamilton County, Ohio, the City of Cincinnati, Ohio, and Messer Construction Co. shall be named as obligees on the Bid Guaranty and Contract Bond.**

A successful bidder submitting a certified check, cashier's check or irrevocable letter of credit as bid security shall be required to furnish and pay for a Contract Bond in accordance with Ohio Revised Code Section 153.57 and the Instructions to Bidders. The Contract Bond must be the amount of 100% of the successful bidder's Contract amount. The Board of County Commissioners of Hamilton County, Ohio, the City of Cincinnati, Ohio, and Messer Construction Co. shall be named as Obligees on the Contract Bond.

In accordance with Article 153.12 of the Ohio Revised Code the following is the estimate of cost of the Work as provided by the Construction Manager.

The Banks Bid Package #6 – Lot #23 Park, Lot 23/27 Garage Signage & Security

Total Construction Budget \$8,834,064

Bidders shall comply with the prevailing wages.

Bidders shall comply with Ohio Revised Code Section 153.59 to ensure that in the hiring of employees for the performance of work under the contract or any subcontract, no contractor, subcontractor, or any person acting on a contractor's or subcontractor's behalf, by reason of race, creed, sex, disability or military status as defined in section 4112.01 of the Revised Code, or color, shall discriminate against any and all employees and applicants for employment. In addition, Bidders shall comply with equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract.

The Board of County Commissioners of Hamilton County, Ohio reserves the right to reject any or all bids, to waive any irregularities or informalities in bidding, and to withhold final awarding of the contract for sixty (60) days after the opening of bids.

***Economic Inclusion Outreach Session
with Hamilton County and City of Cincinnati
on February 25, 2020 @ 3:00 PM
Location: Messer Construction Co., 643 W. Court St., Cincinnati, OH 45203
Regarding Bid Package #6
THE BANKS – Lot 23 Park Lot 23/27 Garage Signage & Security***

THE BOARD OF COUNTY COMMISSIONERS

Denise Driehaus, President
Stephanie Summerow Dumas, Vice President
Victoria Parks

Jeffrey Aluotto, County Administrator
Holly Christmann, Assistant County Administrator

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Instructions to Bidders

**AIA Document A701 – 1997
1997 Edition – Electronic Format**

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification. AUTHENTICATION OF THIS ELECTRONICALLY DRAFTED AIA DOCUMENT MAY BE MADE BY USING AIA DOCUMENT D401.

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TABLE OF ARTICLES

- 1. DEFINITIONS**
- 2. BIDDER'S REPRESENTATIONS**
- 3. BIDDING DOCUMENTS**
- 4. BIDDING PROCEDURES**
- 5. CONSIDERATION OF BIDS**
- 6. POST-BID INFORMATION**
- 7. PERFORMANCE BOND AND PAYMENT BOND**
- 8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**
- 9. ADDITIONAL REQUIREMENTS**

AMENDED AND MODIFIED FORM OF INSTRUCTIONS TO BIDDERS

**Revised Form Indicates
Changes From Standard
AIA Document A701 – 1997
(As Amended and Modified)**

INSTRUCTIONS TO BIDDERS

ARTICLE I DEFINITIONS

1.1 Bidding Documents include the Bidding Requirements and the Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidder, the bid form and other sample bidding and contract forms. The Contract Documents consist of the form of agreement between the Owner and Contractor specified in Paragraph 8.1 hereof, the General Conditions, the Drawings and Specifications, and all amendments, modifications and addenda to any of the foregoing. If any of these rules, regulations and Specifications conflict with each other or any clauses of this Contract, ODOT required Contract Provisions for Federal Aid Projects shall govern.

1.2 Definitions set forth in the General Conditions and in other Contract Documents are applicable to the Bidding Documents.

1.3 As used herein, "Addendum" or "Addenda" are written or graphic instruments issued by the Architect or Construction Manager prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents. The word "proposal" is used interchangeably with the word "bid".

1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

1.10 The term "Median Bid" shall be interpreted as the Bid where an equal number of all other Bids are higher and lower than said Bid. In the event of an even number of Bids, the "Median Bid" shall be the average of the two Bids where an equal number of all other Bids are higher and lower than the two said Bids.

ARTICLE 2 BIDDER'S REPRESENTATIONS

2.1 The Bidder, by making a Bid, represents that:

2.1.1 The Bidder has read and understands the Bidding Documents and the Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

2.1.2 The Bid is made in compliance with the Bidding Documents.

2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

2.1.3.1 A pre-bid meeting will be held as noted in the Advertisement for Bids. All Bidders are strongly urged to attend the pre-bid meeting, but attendance is not a mandatory prerequisite to bidding. However all Bidders are required to visit the Site prior to Bid date to thoroughly familiarize themselves with existing conditions affecting the Work.

2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

2.2 BID PREPARATION COST

2.2.1 Any and all cost associated with the preparation and submittal of the bid shall be the sole responsibility of the Bidder. The Bidder must certify that the bid and pricing will remain in effect for the duration specified. All materials submitted in response to the ITB will become the property of Owner and may be returned only at Owner's option and at the Bidder's expense.

ARTICLE 3 BIDDING DOCUMENTS

3.1 COPIES

3.1.1 Refer to the Advertisement for Bids for procedure for procurement of Bidding Documents.

3.1.2 Bidding Documents will be issued to anyone registering their interest in the process. Sub-bidders may register with the Owner.

3.1.3 Bidder shall use complete sets of Bidding Documents in preparing Bids; neither the Construction Manager, the Owner nor the Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

3.1.4 The Construction Manager, Owner and/or Architect may distribute copies of the Bidding Documents on the terms set forth in this Section 3.1 for the purpose of obtaining Bids on the Work. No license or right of use is conferred by such issuance of copies of the Bidding Documents.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

3.2.1 The Bidder shall carefully study and compare the various Bidding Documents, shall compare the Bidding Documents with other work being bid concurrently or presently under construction, to the extent it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall immediately report to the Construction Manager all errors, inconsistencies or ambiguities discovered.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall submit a written request to the Construction Manager and Owner at least 10 days prior to the date for receipt of Bids.

3.2.3 Interpretations corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of to Bidding Documents made in any other manner will not be binding, and Bidder shall not be entitled to rely upon them.

3.3 SUBSTITUTIONS

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

3.3.2 Awards will be based on the lowest and best bids.

3.3.3 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

3.4 ADDENDA

3.4.1 Addenda will be transmitted to all parties known by the issuing office to have received a complete set of Bidding Documents.

3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are maintained for inspection purposes.

3.4.3 The bid for which the award is to be made will be opened at the time and place named in the Advertisement for Bids, unless extended by the Owner or its representative or unless, within seventy two hours prior to the published time for the opening of Bids, excluding Saturdays, Sundays, and legal holidays, any modification of the Bidding documents for the Work for which Bids are solicited is issued and mailed or otherwise furnished to persons who have obtained Bidding Documents for the Work, for which the time for opening of Bids shall be extended one week, with no further advertising of Bids required. (Note: Proof of receipt of addendum by bidders shall be "fax" date/time indication if addendum is "faxed", or return receipt if addendum is sent by any other means.)

3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge such receipt in the Bid.

3.4.5 Changes by addenda:

- .1 Addenda will be issued for corrections, revisions and clarifications of Contract Documents prior to bidding.
- .2 Requests for corrections, revisions and clarifications of Contract Documents may be considered by Architect and Construction Manager prior to bid date, and if acceptable to Architect and Construction Manager, may be included in addenda. Bidders are required to submit requests for corrections, revisions and clarifications of Contract Documents to Construction Manager and Owner in writing so as to be received by Construction Manager not less than 10 days prior to bid date to permit Construction Manager and Architect adequate time for consideration of request.

ARTICLE 4 BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

4.1.2 All applicable blanks on all bid forms shall be legibly executed in a non-erasable print medium.

4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change." Failure to bid an Alternate shall be cause for rejection of entire Bid only if said Alternate is accepted by Owner.

4.1.6 Bidders may bid on more than one Bid item. Bidders submitting Bids on several Bid items are requested to submit each separate Bid item in a separate envelope in order to expedite the Bid opening and recording process.

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4.1.7 Each copy of the Bid shall state the legal name of the Bidder, and, if the Bidder is an entity, the type of entity and state of organization of the Bidder. The Bidder shall provide evidence of legal authority to perform work within the jurisdiction of the Work. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid submitted by an authorized agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

4.1.8 Bidders shall fill in where indicated on Bid Form names of manufacturers on which Bidder's bid was based. Failure to list manufacturer shall be cause for rejection of Bidder's Bid.

4.2 BID SECURITY

4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required in Article 9.4 herein. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will furnish bonds guaranteeing the Bidder's faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

4.2.2 Form of Bid security shall be as described in Article 9.4.

4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until the later of (a) execution of the Contract and furnishing of satisfactory payment and performance bonds by Bidder, (b) the expiration of the time period permitted for withdrawal of Bids and (c) rejection of all Bids by Owner.

4.3 SUBMISSION OF BIDS

4.3.1 All copies of the Bid, the bid security and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

4.3.2 All Bids are to be delivered to the location designated in the Bidding Documents prior to the time and date specified in the Bidding Documents for receipt of Bids. Bids received late will be returned unopened.

4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted Bids will not be considered.

4.4 MODIFICATION OR WITHDRAWAL OF BID

4.4.1 Except as provided in Article 5.2.1, a Bid may not be modified, withdrawn or canceled by the Bidder at any time after the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing and signed by the Bidder. Each such notice shall be date- and time-stamped by the receiving party when received to acknowledge receipt thereof. Any modification of the Bid shall be worded so as not to reveal the amount of the original Bid.

4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids, provided that they are then fully in conformance with the requirements of the Bid Documents.

4.4.4 Bid security shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, all Bids which comply with the requirements of the Bidding Documents will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by the required bid security or by other data required by the Bidding Documents as determined by the Owner shall be rejected. A Bid which is in any way irregular, but which otherwise conforms to the requirements of the Bidding Documents, is subject to rejection as determined by the Owner.

5.2.1 Errors in Bids:

- .1 In the event that a Bidder's Bid is substantially lower than the other Bids for the same work, and the Bidder wishes to withdraw its Bid, and the Bid was submitted in good faith, and the reason for the Bid amount being substantially lower was a clerical error as opposed to a judgment error, and was actually due to an unintentional and substantial arithmetic error, or an unintentional omission of a substantial quantity of work, labor or material made directly in the compilation of the Bid, the Bidder shall submit to the Construction Manager and Owner in writing, within two business days (48 business-day hours) after the time of Bid opening stated in the Bidding Documents a written request for consideration of withdrawal of its Bid.
- .2 After due consideration of the bidding error, the Owner may, at his discretion, permit withdrawal of the Bid.

5.3 ACCEPTANCE OF BID (AWARD)

5.3.1 Unless Owner rejects all Bids, Contracts will be awarded as soon as practicable after opening of Bids. In determining lowest and best Bidder, the following elements and factors will be considered by Owner in its sole and absolute discretion, in addition to Bid amount:

- .1 Bidder's performance on publicly funded projects.
- .2 Bidder has adequate equipment and facilities to perform the Work properly and expeditiously.
- .3 Bidder has suitable financial status to meet obligations incident to the Work.
- .4 Bidder's satisfactory compliance with the requirements set forth in the Joint Policy located in Section 008260 of the Project Manual and the Disadvantaged Business Enterprise (DBE) policy and requirements as set forth in this Project Manual.
- .5 Bidder's satisfactory compliance with the requirements set forth in the Responsible Bidder Requirements Applicable to Public Contracts.
- .6 Bidder has appropriate technical experience in projects of similar scope and conditions.
- .7 Bidder can complete the Work in timely and expeditious manner.
- .8 Bidder's satisfactory compliance with the requirements set forth in Article 7 herein.
- .9 Bidder's satisfactory completion and submission of the Bid Submission Documents outlined in Article 9.2.

Owner reserves unrestricted privilege and absolute discretion to reject any, part of any, or all of Bids received and to waive any informalities in bidding.

5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest and best Bid on the basis of the sum of the base Bid and Alternates accepted.

- .1 Owner reserves unrestricted privilege to reject any, part of any, or all of bids received and to waive any informalities in bidding.

5.3.3 No Contract will be awarded if the low Bidder for that Contract is more than 15% below the Median Bid (as defined in 1.10 herein) unless, the following procedure is followed:

- .1 Construction Manager and Architect will hold interview with the Bidder to determine what, if anything, has been overlooked in the Bid in question, and to analyze the process envisioned by the Bidder to complete the Contract.
- .2 The financial status of the Bidder and its Surety shall be examined, based upon certified financial statements submitted by each to the Construction Manager.
- .3 Written confirmation by the Surety shall be submitted to the Construction Manager that it has reviewed the Bid in question and finds it to be in compliance with Contract Documents.
- .4 Bidders may be required to furnish satisfactory evidence of their experience and ability to execute work of like character, scope and size to that of the Work.
- .5 The record of the Bidder in performing other publicly funded projects in the past will be considered.
- .6 If after review and consideration, the acceptance of the lowest Bid is not in the best interest of the Owner, as determined by the Owner, in its sole and absolute discretion, may accept another Bid so opened or reject all Bids and advertise for other Bids.

5.3.4 Owner reserves unrestricted privilege to reject any, part of any, or all of bids received and to waive any informalities in bidding.

5.3.5 No Bid nor any obligation hereunder to be assumed by the Owner, shall be considered as accepted until such time as the Owner, or Owner's representative, may deposit in U.S. Mail, or hand to Bidder personally, written notice addressed to Bidder at address given on Bid of acceptance of Bid."

ARTICLE 6 POST-BID INFORMATION

6.1 POST-BID/PRE-AWARD MEETING

6.1.1 Bidder shall be required to attend a post-bid, pre-award meeting with the Owner, Construction Manager, and Architect, as described in Section 9.3.

6.2 SUBMITTALS

6.2.1 The Bidder will be required to establish to the satisfaction of the Owner, Architect and Construction Manager the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

6.2.2 Persons and entities proposed by the Bidder and to whom neither the Construction Manager nor the Architect have made reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Construction Manager and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

7.1.1 The Bidder shall furnish bonds in compliance with Article 9.4 herein, covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

7.1.2 The cost of Bidder's Bid Guarantee and Contract Bond shall be included in the Bid.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

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8.1 Successful Bidder shall promptly enter into Contract with the Owner. Contract Form shall be "Standard Form of Agreement Between Owner and Contractor," AIA Document A132/CMA, as modified by Owner and included in the Project Manual.

8.2 Owner will issue a Notice to Proceed for each Trade Contract.

ARTICLE 9 ADDITIONAL REQUIREMENTS

9.1 Number of copies of Bid: Each Bidder shall submit an original and four (4) copies of the Bid.

9.2 Required attachments to Bid: The following attachments completed and signed as required shall be submitted with each copy of the Bid (the "Bid Submission Documents"):

- .1 Bid Form.
- .2 Bid Guaranty and Contract Bond or certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit as set forth in Article 9.4 herein.
- .3 For Bid Guaranty and Contract Bond, submit Certificate from the State of Ohio Department of Insurance demonstrating that bonding agent is licensed to do business in the State of Ohio. (Refer to sample form bound into Project Manual.)
- .4 For Bid Guaranty and Contract Bond, submit credentials showing proper power of attorney for the attorney-of-fact of the Surety.
- .5 Non-Collusion Affidavit of Bidder.
- .6 Personal Property Tax Statement.
- .7 Subcontractor and Material Supplier List.
- .8 Warranty Against Unresolved Findings for Recovery.
- .9 Declaration Regarding Material Assistance/Nonassistance to a Terrorist Organization.
- .10 Bidder's Certification Concerning Equal Employment Opportunity Requirements.
- .11 Disadvantaged Business Enterprise Program (DBE) Summary and Bidder's Covenant of Non-Discrimination and DBE Goal Commitment
- .12 Bidder's Responsible Bidder Certification.
- .13 County Registration Form.
- .14 Affidavit in Compliance with Section 3517.13 of the Ohio Revised Code.

9.3 Execution of Contract: Subsequent to and within seven calendar days of pre-award meeting by Construction Manager, the successful Bidders shall return signed Contracts and required submittals to Construction Manager.

9.4 Bid Guaranty and Contract Bond

- .1 Each Bidder shall submit with their bid a Bid Guaranty in the form of either (a) combined Guaranty and Contract Bond, or (2) a certified check, cashier's check drawn on a solvent bank, or an irrevocable letter of credit. If a Bid Guaranty and Contract Bond is submitted with the bid, it shall be for the full amount of the Bidder's base bid, including any alternates. If a certified check, cashier's check or irrevocable letter of credit is submitted, it shall be in the amount of 10% of the bid amount including Base Bid and Alternates. If a certified check, cashier's check or irrevocable letter of credit is submitted, it shall be payable to the Board of County Commissioners of Hamilton County, Ohio, the City of Cincinnati, Ohio, and Messer Construction Company. The Bid Guaranty, in either form, must be in strict compliance with section 153.54 of the Ohio Revised Code, and also Sections 153.57 or 153.571, as applicable. The Board of County Commissioners of Hamilton County, Ohio and the City of Cincinnati, Ohio shall be named as Obligees on the Bid Guaranty and Contract Bond. No other form of bond is acceptable for use as a bid guaranty.
- .2 If the Bid Guaranty and Contract Bond is submitted, the requirements of Section 3905.41 of the Ohio Revised Code may be applicable to require the Bid Guaranty and Contract

Bond to be countersigned by an Ohio resident agent. It is the duty of the Bidder to determine the applicability of Section 3905.41. NONCOMPLIANCE WITH SECTION 3905.41 WILL CAUSE THE BIDDER'S BID TO BE REJECTED. The Board of County Commissioners of Hamilton County, Ohio and the City of Cincinnati, Ohio shall be named as Obligees on the Bid Guaranty and Contract Bond.

- .3 Bid Guaranty and Contract Bond shall be supported by credentials showing the power of attorney for the attorney-of-fact of the bonding agent.
- .4 If the Bid Guaranty and Contract Bond penal sum is left blank by the Bidder, the penal sum of Bid Guaranty and Contract Bond will be the full amount of the Bidder's Base Bid (plus accepted Alternates for Bid Packages that include Alternates). If completed, the penal sum amount shall be not less than the full amount of the Bidder's Bid and all accepted Alternates stated in dollars and cents. A percentage amount in the Bid Guaranty and Contract Bond is NOT acceptable and shall be rejected.
- .5 Bid Guaranties will be returned to all unsuccessful Bidders immediately after Contract is executed.
- .6 The certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit will be returned to the successful Bidder upon filing of the bond required in Division (C), Section 153.54 of the Ohio Revised Code.
- .7 For successful Bidders who have submitted the Bid Guaranty and Contract Bond as bid guaranty, the Contract Bond is the Bid Guaranty and Contract Bond; no other form of Contract Bond is required. For successful Bidders who have submitted a certified check, cashier's check drawn on a solvent bank or irrevocable letter of credit as bid guaranty in compliance with this Article 9.4, the Contract Bond shall be the Contract Bond set forth in Section 006100 of this Project Manual in compliance with Ohio Revised Code Sections 153.54(C) and 153.57. The Contract Bond shall be fully executed and supported by credentials showing the power of attorney for the attorney-of-fact of the bonding agent. Costs of bonds shall be included in all bids.
- .8 **NOTWITHSTANDING ANY OTHER PROVISION HEREIN AND FOR AVOIDANCE OF DOUBT, THE TERM OWNER AS USED HEREIN WITH RESPECT TO THE LOT 23 PARK ONLY, SHALL BE DEFINED AS THE CITY OF CINCINNATI AND HAMILTON COUNTY.**

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

DOCUMENT 001000.3
ADDITIONAL BID CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. The contracting practices used for this project shall conform to the Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project (the "Joint Policy").
- B. The following documents contain additional bid conditions and are supplemental to and an integral part of the "Instructions to Bidders":
 - 1. Special Provision – Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project
 - 2. Special Provision – Responsible Bidder Requirements Applicable to Public Contracts
 - 3. SBE Forms, 2003, 2007, and 2007-a are to be submitted with bid.
 - 4. The Contractor's Non-discrimination Policy also must be submitted with bid.
- C. Small Business Enterprise ("SBE") Participation Goal: Hamilton County and the City of Cincinnati ("Public Parties"), in conjunction with the project's Construction Manager, will establish SBE participation goals for project contracts in accordance with the Joint Policy. The goal related to each contract may differ from the goals of other contracts because of the availability of SBEs or other factors. The Public Parties encourage the participation of SBEs, directly and indirectly, in contracts and procurements related to the Banks Project. Contractors awarded such contracts are encouraged to engage or use SBEs as subcontractors and/or suppliers.

The SBE participation goal for each contract of this bid package is listed below and is expressed in terms of a percentage of the total dollar value of such contract.

SBE Participation Goal - 30%

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END

BID FORM

ACKNOWLEDGMENT OF BIDDER:

Submitted by: _
(enter company name here)

TO: The Board of County Commissioners, Hamilton County, Ohio
Hamilton County Purchasing Department
Room 507, County Administration Building
138 East Court Street
Cincinnati, Ohio 45202

We, the undersigned, having visited the site, carefully studied the local conditions affecting the cost of the work, and having thoroughly examined the Bidding Documents, consisting of the Instructions to Bidders, this Proposal Form, Bonding Requirements, Contract Form, General and Supplementary Conditions, Technical Specifications, Drawings, and Addenda for the Project titled:

The Banks - Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
**Bid Package #6 –Lot 23 Park , Lot 23/27 Garage Signage &
Security**
TC-09 Lot 23 Park TC-10 Lot 23/27 Garage Signage and Security

prepared by THP Limited, Inc., 100 East Eighth Street, Cincinnati, Ohio 45202, for the Board of County Commissioners, Hamilton County, Ohio, do hereby propose to perform all work required to be performed, and to provide and furnish equipment, transportation services, and temporary installations necessary to perform and complete, in a workmanlike manner, such items of work hereinafter designated by and for the sum of money set forth for said items.

ACKNOWLEDGMENT OF ADDENDA:

The undersigned acknowledges receipt of the following Addenda to the Contract documents (indicate Addendum Number and Issue Date):

Addendum No.	Date: _	Page(s): _
Addendum No.	Date: _	Page(s): _
Addendum No.	Date: _	Page(s): _
Addendum No.	Date: _	Page(s): _
Addendum No.	Date: _	Page(s): _
Addendum No. _	Date: _	Page(s): _

A. BIDDER AGREEMENTS:

The undersigned Bidder Agrees:

1. To accept the provisions of these Instruction to Bidders, General Conditions, Supplementary Conditions and Division 1 of the Specifications.
2. To provide and include a Bid Guaranty and Contract Bond as dictated in the Legal Advertisement.
3. That the amounts stated in this Proposal Form represents the entire cost of the work. The completion time stated represents the entire time for performance of the work. The amount bid includes allowances for all fees for permits, taxes and insurance required or applicable to the work. That no claims will be made for any increases in wage scales or material costs.
4. To certify that this bid is genuine not sham or collusive or made in the interest or in behalf of any person not herein named, and that the undersigned has not directly or indirectly induced or solicited any other bidder to put in a sham bid, or any other person, firm or corporation to refrain from bidding and that the undersigned bidder has not in any manner sought by collusion to secure for himself and advantage over any other bidder.
5. And certifies that (we) (he) (they) (has) (have not) previously performed work subject to the President's Executive Order No. 11246.
6. That this bidder will comply with all City, State, and Federal Statutes relating to Liability Insurance, Working Hours, Minimum Wages, Safety and Sanitary Regulations, which in any way may affect those engaged or employed on the work in the event that the award of the Contract is made on the Proposal herein submitted.
7. That the bidder will comply with any new laws or acts regulating public buying procedures.
8. Refer to additional instructions for bidder registration process (See Article 9 in Supplementary Instructions to Bidders).

BID FORM STIPULATIONS:

1. The wording of this proposal shall be used throughout, without damage, alteration or addition. Any change in wording may cause it to be rejected.
2. Include all required forms.
3. Bid amounts shall be provided in both words and figures. The worded amount shall govern in the case of discrepancies or in cases of error in extending the total amount of the bid, the unit price may govern.
4. In the event that qualified bidders submit equal bids (to the penny) and are deemed the lowest and best bidders for that trade's bid, those bidders agree to let the County award the contract to the bidder selected by the current "tied bid" procedures used by the Hamilton County Purchasing Department.

5. The Board of County Commissioners reserves the right to reject any or all bids and, unless otherwise specified by the bidder, to accept any item in the bid.

C. ALLOWANCES:

The County may after the bids are opened add an allowance to the contract at its own discretion. This allowance shall be added to the contract and so denoted in the contract in section 7.6. Any allowances added by the County shall be for incidentals associated with this project. If unused, during the project all allowance monies shall be returned to the County at the end of the project or at the County's request.

A. General:

1. Work related to cash allowances will be performed on a time and material basis. The Contractor shall furnish and certify daily detail records of all labor and materials provided.
2. If the cost to complete the work is less than the cash allowance, a deduct Change Order will be prepared by the County for the cost difference.

B. Cash Allowance Items:

1. Trade Contract TC-09 Cash Allowance No. 1: \$550,000
2. Trade Contract TC-10 Cash Allowance No. 2: \$250,000

D. AWARDING:

The selection process includes but is not limited to:

1. The results of the evaluation where Hamilton County selects a bidder(s) who it determines to be the Lowest and Best Bidder(s) meeting all required specifications.
2. The Lowest and Best determination shall be based on the Base Bid first then any accepted Alternates. Accepted Alternates must not exceed the published estimate by 10% or the current Ohio Revised Code stipulation for public bidding.
3. A Base Bid must be submitted prior to bidding any Alternate bids. If a bidder does not bid all of the alternates, unit prices or options the County may still consider the proposal and judge it equally to determine which proposal is Lowest and Best and in the best interest of the County.
4. Substitutions not approved prior to the bid opening cannot be used in the determination of the Lowest and Best bid determination.
5. If Hamilton County and the bidder are unable to successfully come to terms regarding the bid and the subsequent contract, Hamilton County reserves the right to terminate contract discussions with the bidder(s) and select the next apparent low bidder.

Hamilton County reserves the right to:

1. Reject any or all bids.
2. Waive any informality in the bids.
3. Eliminate conditions or terms that are not in the best interest of Hamilton County and its residents.

E. ADDITIONAL BID REQUIREMENTS:

The Bidder is instructed to review the “Summary of Work” for information on “Time of Completion”, “Work Hours”, “Permits” and “Prime and Sub-Contractors Assignments”. The “General Conditions” and “Supplementary Conditions” for information on “Asbestos” and the “Legal Advertisement” for information on “Pre-Bid Meetings”.

F. BID PROPOSALS:

Bidder's Name: _

Each bidder is required to fill out all entries in the proposal section. Enter "NO BID" where no bid will be entered for this proposal.

BASE BID – TC-09 Lot 23 Park	
TOTAL COST	LUMP SUM
	\$
<i>(enter amount in words)</i>	<i>(enter amount in numbers)</i>

For reference only provide a breakdown of the total prices listed in the Base Bid. This breakdown is solely a reference tool to be used by the County and shall not enter into the determination of the winning bidder for this project. The summation of the lines below should equal your total price listed above.

Base Bid Material: \$_____ (in numbers)

Base Bid Labor: \$_____ (in numbers)

BASE BID – TC-10 Lot 23/27 General Trades	
TOTAL COST	LUMP SUM
	\$
(enter amount in words)	(enter amount in numbers)

For reference only provide a breakdown of the total prices listed in the Base Bid. This breakdown is solely a reference tool to be used by the County and shall not enter into the determination of the winning bidder for this project. The summation of the lines below should equal your total price listed above.

Base Bid Material: \$ (in numbers)

Base Bid Labor: \$

(in numbers)

G. ALTERNATES: None

H. UNIT PRICING:

A. General:

1. Unit Price shall be used for adjusting the cost of work added to or deducted from the Base Bid Work defined in the Specifications and Drawings.

a. The Contractor shall furnish and certify daily detail records of all labor and materials provided.

b. Unit Prices shall be inclusive of all costs for overhead, profit, fees, taxes (where applicable), handling, and installation for completed in-place work.

- A. Trade Contact TC-09 Unit Price UP-01 (A single Add/Deduct Concrete Per Cubic Yard including Reinforcing – Pile Caps)

_____ Per Cubic Yard DOLLARS (\$_____)

- B. Trade Contact TC-09 Unit Price UP-03 (A Single Add/Deduct price per Square Foot for Granite Pavers

_____ Per Square Foot DOLLARS (\$_____)

I. Completion Dates:

It is understood and agreed that all Work to be performed under Contract TC-09 and TC-10 shall be completed in the timeframe as specified in Section 013216 following date set forth in Notice to Proceed with Work unless an extension of time is granted by the Owner in accordance with Contract Documents.

Bidder's Name: _____

All Prime Contractors hereby acknowledge and accept all responsibilities assigned to them by the General Conditions, Supplementary General Conditions, and Division One. All fees for supervision and coordination are included in the bids.

Bids submitted by virtue of this Proposal hereby are acknowledged by the Owner to be made under the conditions that the Bidder will not be prevented, on account of strikes or other disruptions affecting source of supply, from obtaining materials necessary to carry out his contract to complete the construction covered thereby.

It is understood and agreed by the undersigned that the Owner reserves the right to reject any and all bids.

It is agreed that this Proposal shall be irrevocable for a period of Sixty (60) days after receipt of same by the Owner at the Day and Place set forth in the "Legal Advertisement".

[] We have read and agree to the terms listed above.
(check here)

Firm Name: _____

() Corporation () Partnership () Sole Proprietorship (check one)

Authorized Offerror (print name): _____

Authorized Signature (sign name): _____

Title: _____

Official Address: _____

E-mail Address: _____

Telephone Number: _____

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.5
BID GUARANTY AND CONTRACT BOND

(SECTION 153.571 OHIO REVISED CODE)

KNOWN ALL MEN BY THESE PRESENTS, that the undersigned

(Name and Address)

as Principal and _____

(Name of Surety)

as Surety, are hereby held and firmly bound unto the Board of County Commissioners of Hamilton County, Ohio, City of Cincinnati, Ohio, and Messer Construction Company as Obligees, in the penal sum of the dollar amount of the bid submitted by the Principal to the Obligees on _____

to undertake the project known as: _____

The penal sum referred to herein shall be the dollar amount of the Principal's bid to the Obligees, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to the Obligees, which are accepted by the Obligees. In no case shall the penal sum exceed the amount of

_____ dollars (\$_____).

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

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

NOW, THEREFORE, if the Obligees accept the bid of the Principal and the Principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the Principal pays to the Obligees the difference not to exceed ten percent of the penalty hereof between the amount specified in the bid and such larger amount for which the Obligees may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the Obligees does not award the contract to the next lowest bidder and resubmits the project for bidding, the Principal will pay the Obligees 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 void, otherwise to remain in full force and effect. If the Obligees accept 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; and

IF THE SAID Principal shall well and faithfully perform each and every condition of such contract; and indemnify the Board of County Commissioners of Hamilton County, Ohio and the City of Cincinnati, Ohio against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefor; and shall pay all lawful claims of subcontractors, materialmen, 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 materialman or laborer having a just claim, as well as for the Obligees herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

of said contract or in or to the plans specifications therefore shall in any wise affect the obligations of said Surety on this bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

The Surety shall not be liable to the Primary Obligee, the Additional Obligees, or any of them, unless the Primary Obligee, the Additional Obligees, or any of them shall make payments to the Principal (or in the case the Surety arranges for completion of the Contract to the Surety) strictly in accordance with the terms of said Contract as to payments and shall perform all other obligations to be performed under said Contract at the time and in the manner therein set forth; and

PROVIDED, FURTHER that the aggregate liability of the Surety under said Bond to any or all of the Obligees, as their interests may appear, is limited to the penal sum of said Bond, and that the Additional Obligees' rights hereunder are subject to the same defenses Principal and/or Surety have against the Primary Obligee, and that the total liability of the Surety shall in no event exceed the amount recoverable from the Principal by the Primary Obligee under said Contract.

SIGNED AND SEALED This _____ day of _____, 20____

PRINCIPAL:

BY: _____

TITLE: _____

SURETY: _____

BY: _____

Attorney-in-Fact

Approved _____, 20____

BOARD OF COUNTY COMMISSIONERS
HAMILTON COUNTY, OHIO

CITY OF CINCINNATI

SURETY COMPANY ADDRESS:

Street

City State Zip

Telephone

SURETY AGENTS ADDRESS:

Agency Name

Street

City State Zip

Telephone

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

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.6
CERTIFICATE OF COMPLIANCE

STATE OF OHIO
DEPARTMENT OF INSURANCE

As **DIRECTOR OF INSURANCE OF THE STATE OF OHIO**, I do hereby certify the
_____, a corporation located at _____ in the State of
_____, has complied in all respects with the laws of this State applicable to it, and is authorized
to transact in this State its appropriate business of insurance as described by Section 3929.01 (A), lines:

- | | | | | | |
|-----|-----|---|-----|----|-----------------------|
| () | 1 | Fire | () | 18 | Aircraft (all perils) |
| () | 2 | Allied Lines | () | 19 | Fidelity |
| () | 3 | Farmowners Multiple Peril | () | 20 | Surety |
| () | 4 | Homeowners Multiple Peril | () | 21 | Glass |
| () | 5 | Commercial Multiple Peril | () | 22 | Burglary & Theft |
| () | 6 | Ocean Marine | () | 23 | Boiler & Machinery |
| () | 7 | Inland Marine | () | 24 | Credit |
| () | 8 | Financial Guaranty | () | 25 | Reinsurance Only |
| () | 9 | Medical Malpractice | () | 26 | Other (List) |
| () | 10 | Earthquake | | | |
| () | 11 | Group A & H | | | |
| () | 12 | Credit A & H (Group & Individual) | | | |
| () | 13a | Collectively Renewable A & H | | | |
| () | 13b | Noncancellable A & H | | | |
| () | 13c | Guaranteed Renewable A & H | | | |
| () | 13d | Nonrenewable for Stated Reasons Only | | | |
| () | 13e | Other Accident Only | | | |
| () | 13f | All Other A & H | | | |
| () | 14 | Workers' Compensation (to the extent permitted by law) | | | |
| () | 15 | Other Liability | | | |
| () | 16a | Private Passenger Auto No-Fault (personal injury protection to the extent permitted by law) | | | |
| () | 16b | Other Private Passenger Auto Liability | | | |
| () | 16c | Commercial Auto No-Fault (personal injury protection to the extent permitted by law) | | | |
| () | 16d | Other Commercial Auto Liability | | | |
| () | 17a | Private Passenger Auto Physical Damage | | | |
| () | 17b | Commercial Auto Physical Damage | | | |

FROM: _____, 20____ UNTIL: _____, 20____
_____, 20____

In witness whereof, I have signed my
name and caused my seal to be affixed
at Columbus, Ohio, this day and date

Director of Insurance of Ohio

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.7

NON-COLLUSION AFFIDAVIT OF CONTRACTOR

THIS AFFIDAVIT MUST BE FILLED OUT AND EXECUTED BY THE BIDDER; IF THE BID IS MADE BY A CORPORATION, THEN BY ITS PROPERLY AUTHORIZED AGENT

State of Ohio, County of Hamilton, ss. _____

(Name of Bidder or Bidders)

being duly sworn does depose and say that _____ resides

(Bidder's Authorized Representative)

at _____

(Address of Bidder)

and that _____

(Give names of all persons, firms or corporations interested in bid)

is/are the only person(s) interested with _____

(Name of Bidder)

in the profits of the Contract to be predicated on the within bid; that the said Contract will be performed without any connection or interest in the profits thereof with any other person making any bid or proposal for said work; that said bid, is on _____ part, in all

(His/Her/Their)

respects fair, and without collusion or fraud; and also that no member of the Board of County Commissioners or the City of Cincinnati, Ohio, or any other officer or employee of Hamilton County, or the City of Cincinnati, Ohio, is directly or indirectly interested therein.

Subscribed and sworn to this _____

day of _____, 20____ before

me _____

(Notary Public)

(Signature of Bidder's Authorized Representative)

(Print Name of Bidder's Authorized Representative)

(Address of Bidder)

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.8
BIDDER'S CERTIFICATION CONCERNING
EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS

1. _____ (Name of Bidder) certify that I
intend to use the following listed construction trades in the work under the Contract:

2. The bidder hereby certifies that he **has**, **has not**, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive orders 10925, 11114, or 11246, and that he **has**, **has not**, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements. **The Bidder must circle the appropriate "has or has not" above.**

Authorized Representative of Bidder Date

On behalf of _____
(Name of Bidder)

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.9
PERSONAL PROPERTY TAX STATEMENT

In accord with Section 5719.042 of the Ohio Revised Code, I hereby certify that the company I represent is not delinquent in payment of personal property taxes to the State of Ohio or any subdivision thereof.

Title

TO BE COMPLETED BY NOTARY PUBLIC

On this day, there appeared before me _____
(Print Full Name)

saying that (he) (she) is _____ of
(Print Title)

_____ and that (he) (she)
(Print Name of Company)

understands all of the implications of the above statement and has signed in good faith.

Signature of Notary Public

Seal

Date

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.10

SUBCONTRACTOR AND MATERIAL SUPPLIER LIST

Bidder must list below all subcontractors and material suppliers used in compilation of bid. Branches shall be listed in the order appearing in the Project Manual index except as otherwise indicated. Contractor shall list its name for those branches, which it will complete with its own forces.

BRANCH	MATERIAL SUPPLIER AND/OR SUBCONTRACTOR NAME AND ADDRESS
--------	--

NOTE: This listing is not meant to commit bidder to material suppliers or subcontractors above. If bidder can show just cause at time of awarding Contract that a specific material supplier or subcontractor has withdrawn its bid or raised its bid, bidder may substitute at no additional cost to the County a material supplier or subcontractor upon written approval of the County.

END OF SECTION

THE BANKS PROJECT

Small Business Enterprise Program Summary

DOCUMENT 001000.11

Hamilton County (the "County") and the City of Cincinnati (the "City") are committed to maximizing subcontracting and procurement opportunities for all qualified and available small business enterprises ("SBEs"). For this purpose, the County and the City (The "Public Parties") have established the Banks Small Business Program (the "SBE Program"). The SBE Program requires Contractors to use their "good faith efforts" to facilitate achievement of SBE participation goals.

The requirements of the SBE Program do not apply to individual contracts and/or procurements valued at \$5,000.00 or less. The SBE Program includes the following components:

- **SBE Participation Goal:** This component **encourages** Contractors to make subcontracting opportunities available to small businesses which have been certified as SBEs by the City in order to achieve the percentage SBE participation goal assigned to the related contract as specified in the bid/RFP/RFQ package. To count towards the SBE participation goal, the SBE must be certified in the commodity or service code(s) that will be used on the project. A list of SBEs certified by the City is available on the City's website at <http://cincinnati.diversitycompliance.com> or from the City's Office of Contract Compliance ("OCC").
- **Outreach/Good Faith Efforts.** This component requires Contractors to provide evidence of the outreach efforts made to SBEs in connection with the contracts related to the Banks Project.

All contracts and procurements awarded for the Banks Project, except those for professional services, will be awarded to the "lowest and best" bidder. Therefore, the inability of a Contractor to meet the SBE goals established under the SBE Program will not exclude the Contractor from award of a contract or procurement if the Contractor's proposal or bid otherwise is deemed by the County and/or the City, as the case may be, to be the "lowest and best bid." However, a Contractor's failure to submit a SBE utilization plan with the Contractor's proposal or bid may result in a determination that the submitted proposal or bid is non-responsive, and rejection of the proposal or bid.

Pursuant to the SBE Program requirements, the following items are included in the bid/RFP/RFQ package and must be completed, signed and submitted with each submitted proposal or bid; failure to complete these forms with all the requested information may cause a proposal or bid to be determined to be non-responsive:

1. **Statement of Good Faith Efforts (Form 2007)**
2. **Outreach/Good Faith Summary Sheet (Form 2007-a)**
3. **Subcontractor Utilization Plan (Form 2003)**

The following forms are included in the proposal or bid invitation package for information purposes only and do not have to be completed or returned with the proposal or bid.

1. **Form 2004 – Subcontractor Approval Request:** (must be completed and submitted to OCC after contract award and prior to commencement of work on the project).
2. **Form 2005 – Subcontractor Monthly Business Utilization Report:** (must be submitted with monthly invoice).
3. **Form 2006 – Subcontractor Substitution Form:** (must be submitted for advance approval for any proposed change in subcontractors).

**If you have any questions or need assistance in meeting these requirements, please feel free to contact
OCC at (513) 352-3144 or Andra Conaty at (513) 946-3894.**

(The Banks - Revised March, 2019)

The Banks – Public Infrastructure Development Parking Garage and Street Grid

Statement of Good Faith Efforts

Bid or Proposal Reference Number: _____ **Type of Inclusion Program:** SBE or DBE

By the signature below of an authorized representative, Contractor certifies that Contractor has utilized the following methods to obtain the maximum practical participation by Small Business Enterprises (SBEs) certified by the City of Cincinnati Office of Contract Compliance or Disadvantaged Business Enterprises (DBEs) certified through the Ohio DBE Unified Certification Program. Please indicate which methods used by placing an X in the appropriate space.

YOU MUST SUBMIT YOUR SUPPORTING DOCUMENTATION WITH YOUR BID. NEW INFORMATION WILL NOT BE ACCEPTED AFTER THE BID CLOSING DATE.

1. ____ Identified sufficient subcontracting work to meet goal (**attach content of advertisements and written notices to SBEs/DBEs indicating type of work to be subcontracted**).
2. ____ Bidder has coordinated SBE/DBE inclusion efforts with the Economic Inclusion Consultant, Messer Construction Co. (513-482-5419 or swalton@messer.com) to ascertain the availability of SBE/DBE subcontractors/subconsultants/suppliers for the scopes of work.
3. ____ Advertising - Attach content of advertisements, which must include project name, Contractor's name, work available, contact person's name and number, information on availability of plans and specifications and Contractor's policy concerning assistance to SBEs/DBEs in obtaining bonding, financing, and/or insurance; also provide date of advertising and names of publications.
4. ____ Written notice to SBEs/DBEs for subcontracting opportunities (submit copy of each letter sent, confirmation of receipt by SBE/DBE, or if available master notification, submit copy of letter and recipient list).
5. ____ Notice described in item 4., above, was sent at least five (5) business days prior to the bid opening date.
6. ____ Follow-up initial solicitations, attach copies of Outreach/Good Faith Summary Sheet (Form 2007-A).
7. ____ Assistance with securing bonding, financing and/or insurance (submit copy advertising and written notice to SBEs/DBEs).
8. ____ Provision of plans, specifications and requirements: Contractor provided interested SBEs/DBEs with access to plans, specifications and requirements for subject project.
9. ____ Provide documentation detailing reason(s) why agreement was not reached with SBEs/DBE (s) who responded affirmatively in writing. Include written explanation for rejection of SBE/DBE proposals.
10. ____ Other (Please list any other methods utilized that are not covered above):

Name of Contractor

Contractor Representative (Signature)

Date

Contractor Representative (Printed Name)

Title

**The Banks – Public Infrastructure Development Parking Garage and Street Grid
SBE/DBE Outreach & Good Faith Efforts Summary Sheet**
Bid or Proposal Reference Number: _____

Contractor/Consultant Name:			Address/City/State/Zip/Telephone:		
Bid/Proposal Name:			Bid/Proposal Due Date:	Type of Bid Package: DBE or SBE	
SBE/DBE Subcontractor/Supplier's (Name/Address/City/State/Zip)	Type of Work/Supplies Solicited	Indicate Date and How SBE/DBE Contacted (e.g., Letter, Phone, Fax, etc)	SBE/DBE Response to Solicitation (e.g., Will Submit Bid, No Response, Not Interested) and Date	Contact Person	Phone Number

Please list above the name(s) of all firms contacted and their responses to the specified proposal or bid package. If additional space is required this form may be duplicated.

I hereby certify that the above information is true and accurate:

Contractor Representative Signature

Print Name/Title

Date

**The Banks – Public Infrastructure Development Parking Garage and Street Grid
SBE/DBE Subcontractor Utilization Plan**

Bid or Proposal Reference Number: _____

Contract Description:	Total Bid Amount: \$	Date submitted:
Contractor Name/Address/City/State/Zip/Phone:	Federal Tax ID Number:	Type of Inclusion Program (circle one): SBE DBE

Contractor is certified by the City of Cincinnati Office of Contract Compliance as an SBE and meets the SBE participation goals without using other SBEs: Yes or No

OR

Contractor is certified through the Ohio DBE Unified Certification Program as a DBE and will self-perform _____ % of the DBE participation goal. Yes or No

The above named Contractor proposes to use the services of the following listed subcontractor/supplier(s) demonstrating sufficiency to meet or exceed the SBE/DBE participation goal. The contractor must list all SBEs/DBEs, regardless of contract amount or type of service. Failure to complete this form with all the requested information (as indicated in each column) may cause a bid or proposal to be determined non-responsive.

Name/Address/City/State/Zip/Phone	Federal Tax ID#	Describe Exact Type Of Work /Supplier	Subcontract Dollars	Subcontract/Supplier Percentage of Contractors Total Bid Amount	FOR OFFICE USE ONLY (SBE/DBE CALCULATION)

The Contractor certifies that the above information is true to the best of its knowledge. The Contractor acknowledges and agrees that, if awarded the contract, the information provided on this Form 2003 shall be incorporated into the terms and conditions of the final contract between the Owner and the Contractor, as long as the Subcontractor(s) meet the approval of the Owner (see Form 2004). Contractor acknowledges and agrees that any changes to the above information, after the contract is awarded, must be submitted in writing on the Substitution Form 2006 and approved in advance by the Owner.

CONTRACTOR REPRESENTATIVE (SIGNATURE): _____

PRINTED NAME: _____ **Title:** _____ **Date:** _____

If Additional Space is Needed, Please Use Copies of This Form.

The Banks – Public Infrastructure Development Parking Garage and Street Grid

FORM 2004
SUBCONTRACTOR APPROVAL REQUEST
Statement of Intent to Utilize Firms

Bid or Proposal Reference Number: _____

This form must be completed for each subcontractor, subconsultant and/or supplier, and submitted **to the Construction Manager after bid opening, but before contract award and before work begins**. Information recorded herein will be incorporated in the Contractor's contract. All subcontractors and/or suppliers must be approved prior to starting work on the project.

Contractor Name	Type of Inclusion Program (circle one): SBE DBE	Contract Amount \$
Contractor Representative	Title	Telephone Number
Contractor Address	City/State	Zip Code
Federal Tax ID #	E-mail Address	

SUBCONTRACTOR

Subcontractor Name	Address	City/State/Zip Code
Subcontractor Representative	Title	Telephone Number
Federal Tax ID #	E-mail Address	

Is Subcontractor a SBE certified by the City of Cincinnati Office of Contract Compliance? YES or NO
OR
Is Subcontractor a DBE certified through the Ohio DBE Unified Certification Program? YES or NO

ITEM NUMBER	DESCRIPTION OF WORK AND/OR SUPPLIES	SUBCONTRACTOR'S CONTRACT AMOUNT \$	% OF TOTAL CONTRACT PRICE	ESTIMATED START DATE	COMPLETION DATE
Total Value of Work					

SIGNATURES

Subcontractor Representative	Date
Contractor Representative	Date
City of Cincinnati Contract Compliance Officer	Date
Hamilton County Compliance Officer	Date

[illegible]

If Additional Space is Needed, Please Use Copies of This Form.



THE BANKS PROJECT
SBE/DBE/MBE/WBE SUBCONTRACTOR SUBSTITUTION REQUEST
Bid Reference No. _____

THIS FORM MUST BE COMPLETED AND APPROVED BY THE BANKS REVIEW COMMITTEE PRIOR TO TERMINATING A CONTRACT WITH A SMALL BUSINESS ENTERPRISE (SBE) OR DISADVANTAGED BUSINESS ENTERPRISE (DBE) AFTER THE BIDS OR PROPOSALS HAVE BEEN SUBMITTED OR CONTRACT HAS BEEN AWARDED. **CONTRACTOR MUST PROVIDE A WRITTEN EXPLANATION FOR THE SUBSTITUTION REQUEST.** INFORMATION RECORDED HEREIN WILL BE INCORPORATED IN THE Awardees' CONTRACT.

Company Name: _____ Project Name: _____

Address: _____ Date Submitted _____

_____ will be substituted for _____ to perform work on
 (Name of Subcontractor/Supplier) (Name of Subcontractor/Supplier)

Or supply goods for the above described contract.

_____ will enter into a formal agreement for the work upon approval by the Owner and agrees with
 (Subcontractor/Supplier)

New Subcontractor/Supplier EIN#: _____ Circle Type of Business: SBE DBE MBE WBE NONE

Must attach a copy of the reason for SBE substitution for review prior to any contractor performing work on this portion of the project.

ITEM NUMBER	DESCRIPTION OF WORK	SUBCONTRACT/P.O. PRICE	% OF TOTAL CONTRACT PRICE	START DATE	COMPLETION DATE
	Total Value of Work				

Prime/General Contractor:

Signature of Company Representative _____

Title: _____ Date: _____ EIN#: _____

Subcontractor/Supplier Replaced: I relinquish my quote for the above contract.

Signature of Company Representative _____

Title: _____ Date: _____ EIN#: _____

Request : Approved _____ Denied _____

_____ Date _____

Authorized Committee Representative Signature

JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC INCLUSION AND WORKFORCE DEVELOPMENT FOR THE BANKS PROJECT

1. Banks Project Economic Inclusion Policy

1.1 Purpose. The Banks project is a joint property development project of Hamilton County, Ohio (the “County”), the City of Cincinnati, Ohio (the “City”) and a master developer, Riverbanks Renaissance, LLC (the “Developer”). The Mayor of the City, Cincinnati City Council (the “Council”) and the Commissioners of Hamilton County, Ohio (the “Commissioners”) have established this Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development (this “Banks Inclusion Policy”) for the Banks development project (the “Banks Project”) for the purpose of promoting equal business opportunity for small and disadvantaged businesses, including minority-owned and women-owned firms, and to ensure that such businesses receive or participate directly or indirectly in contracts and procurements related to the Banks Project awarded by the County and/or the City. Further, this Banks Inclusion Policy has been adopted to support and encourage the participation of small businesses and disadvantaged businesses, including, but not limited to, those owned by minorities and women, in the retail, hospitality and entertainment components of the Banks Project through active recruitment, facilitation of relationships and aggressive information-sharing. This Banks Inclusion Policy also has been established for the purposes of ensuring non-discrimination in the award and administration of such contracts and procurements and to promote the economic inclusion of qualified workers in the local region through employment opportunities related to the Banks Project.

2. Non-Discrimination Policy

2.1 Contracts and Procurements. The County and the City each is an equal business opportunity government which provides, and will continue to provide, equal access to contracting and procurement opportunities for all businesses. It is the policy of the County and the City that no contracts should be awarded, and no procurement decisions should be made, by or on behalf of the County and/or the City as the result of unlawful discrimination based upon race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth.

2.2 Employment. The County and the City each has a long-standing commitment to ensuring non-discrimination and equal opportunity in employment. Under federal and state laws, the County and the City are obligated to avoid unlawful discrimination, to ensure that their respective contractors and suppliers avoid unlawful discrimination, and to ensure that contractors, subcontractors and suppliers for the Banks Project are selected by the County, the City and their respective contractors and suppliers without engaging in unlawful discrimination. Prior to being awarded a contract or procurement with the County or the City, each Contractor shall be required to certify in writing to the County or the City, as the case may be, that (a) the Contractor will comply with all of the requirements of this non-discrimination policy (the “Non-discrimination Policy”) and (b) the Contractor, directly or indirectly, (i) has not engaged, is not

engaged and will not engage in any kind of unlawful discrimination involving race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth, whether or not such unlawful discrimination is related to a contract or procurement activity involving the Banks Project, and (ii) will not, for any purpose related to the Contractor's engagement with respect to the Banks Project, employ or contract with any person or business which the Contractor knows or has reason to know has engaged, is engaged, or will engage in such unlawful discrimination, whether or not such unlawful discrimination is related to a contract or procurement activity or involving the Banks Project. As used herein, "**Contractor**" means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

3. DBE Policy Statement and Objectives [49 CFR Part 26.23]

3.1 Policy and Objectives. The County and the City have received, or may receive, federal financial assistance from the U. S. Department of Transportation (the "DOT") to finance a portion of the Banks Project and, as a condition to receiving such assistance, must comply with DOT regulations under 49 CFR Part 26, "*Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs*". In order to comply with DOT requirements and to give effect to this Banks Inclusion Policy, the County and the City have adopted this Disadvantaged Business Enterprise (as defined below) policy ("DBE Policy") and have established a Disadvantaged Business Enterprise program for DOT-assisted contracts related to the Banks Project (the "DBE Program") in accordance with applicable DOT regulations. It is the policy of the County and the City to ensure that DBEs as defined in 49 CFR Part 26 have an equal opportunity to receive and participate in DOT-assisted contracts ("DBE Policy"). It also is the policy and objectives of the County and the City:

- (a) To ensure non-discrimination in the award and administration of DOT-assisted contracts;
- (b) To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
- (c) To ensure that only firms that fully meet eligibility standards set forth in 49 CFR Part 26 are permitted to participate as DBEs in the DBE Program;
- (d) To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
- (e) To help remove barriers to the participation of DBEs in DOT-assisted contracts; and
- (f) To assist with the development of firms that can compete successfully in the marketplace outside of the DBE Program.

3.2 Liaison Officer. The Director of Hamilton County Small Business Development has been designated as the DBE liaison officer for the DBE Program (the “DBE Liaison Officer”). In that capacity, he/she is responsible for implementing all aspects of the DBE Program and ensuring that the County and the City comply with all provisions of 49 CFR Part 26 in connection with the award and performance of DOT-assisted contracts related to the Banks Project. Implementation of the DBE Program shall be accorded the same priority as compliance with all other legal obligations incurred by the County and the City in their financial assistance agreements with the DOT. The DBE Liaison Officer shall have direct and independent access to the Commissioners, the County Administrator of Hamilton County (the “County Administrator”), the Mayor of Cincinnati (the “Mayor”) and the Council with respect to matters concerning the DBE Program. [49 CFR Part 26.25]

3.3 Dissemination of Policy. The County has disseminated or will disseminate this DBE Policy statement to the Commissioners and all departments and divisions of the County. The City has disseminated or will disseminate this DBE Policy statement to the Mayor and all departments and divisions of the City. This DBE Policy statement also shall be distributed to DBEs and non-DBE business communities that currently perform, or have performed, work for the County or the City on DOT-assisted contracts by publishing this statement in general circulation, minority-focused and trade association publications, by electronic or regular mail to local disadvantaged business development organizations and by posting a copy of this DBE Policy statement on the County’s website and the City’s website. [49 CFR Part 26.23]

3.4 No Quotas or Set-Asides. Neither the County nor the City will use quotas or will set aside contracts for DBEs on DOT-assisted contracts or in any way in the administration of the DBE Program, except as permitted under DOT regulations to address egregious instances of unlawful discrimination. [49 CFR Part 26.43]

3.5 Expiration. The County and the City shall continue to carry out the DBE Program until all funds from DOT financial assistance for the Banks Project have been expended. [49 CFR Part 26.21(c)]

4. DBE Program Requirements

4.1 Definitions. [49 CFR Part 26.5]

4.1.1 “**Disadvantaged Business Enterprise**” or “**DBE**” means a for-profit small business concern that is at least 51% owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51% of the stock is owned by one or more such individuals; and whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals who own it. To be eligible for DBE certification under the DBE Program, (i) a firm (including its affiliates) must be an existing small business, as defined by the U. S. Small Business Administration (“SBA”) standards, and must not have average annual gross receipts as defined by SBA regulations over the firm’s previous three fiscal years in excess of \$20.41 million (subject to adjustment from time to time for inflation); [49 CFR Part 26.65]

4.1.2 “**DOT-Assisted Contract**” means any contract between the County and/or the City and a contractor (at any tier), funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees, except a contract solely for the purchase of land;

4.1.3 “**Socially and economically disadvantaged individual**” means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

(a) An individual who the County or the City finds to be a socially and economically disadvantaged individual on a case-by-case basis;

(b) An individual in one or more of the following groups, members of which are *rebuttably presumed* to be socially and economically disadvantaged:

(i) “Black Americans,” which includes persons having origins in any of the Black racial groups of Africa;

(ii) “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(iii) “Native Americans,” which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

(iv) “Asian-Pacific Americans,” which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

(v) “Subcontinent Asian Americans,” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women; and

(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

An individual whose personal net worth exceeds \$750,000 (excluding the individual’s ownership interest in the firm applying for DBE certification, the individual’s equity in his or her primary residence and any contingent liabilities) is deemed not to be economically disadvantaged. [49 CFR Part 26.67(d)]

All terms used in this DBE Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in 49 CFR Part 26.

4.2 Non-Discrimination. [49 CFR Part 26.7] Neither the County nor the City will exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract covered by 49 CFR Part 26 on the basis of race, color, sex, or national origin. In administering the DBE Program, neither the County nor the City will, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the DBE Program with respect to individuals of a particular race, color, sex or national origin.

4.3 DBE Financial Institutions. [49 CFR Part 26.27] The County and the City will investigate thoroughly the full extent of services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals in the County, if any, and shall make reasonable efforts to use these institutions and to encourage prime contractors for DOT-assisted contracts related to the Banks Project to use such institutions. Any information on the availability of such institutions shall be maintained by the DBE Liaison Officer.

4.4 DBE Directory. [49 CFR Part 26.31] The County and the City shall maintain and make available to interested persons a directory identifying all firms eligible to participate as DBEs in the DBE Program. For each firm, the directory will include its address, phone number, and types of work the firm has been certified to perform as a DBE. The directory will be made available on request to interested persons, including bidders, for work related to the Banks Project in connection with their efforts to meet the DBE goals established by the County and the City and made a part of bid specifications. The directory will serve as a primary source for locating potential contractors and suppliers. The directory will be revised at least annually and updated information included in the directory will be made available to contractors and the public on request.

4.5 Required Contract Clauses. Both the County and the City will require the following assurance to be included in every DOT-assisted contract between the County or the City, as the case may be, and a contractor, and in each subcontract the contractor signs with a subcontractor:

“The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the County and/or the City deems appropriate.” [49 CFR Part 26.13(b)]

The County and the City will include the following clause in each DBE-assisted prime contract:

“The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from the County and/or the City. If the County and/or the City require retainage from the prime contractor and incremental acceptances of portions, as determined by the County or the City, as the case may be, of the contract work are made by the County and/or the City, then the prime contractor agrees to return all related retainage from subcontractors, if any, within ten (10) days after receiving payment from the County and/or the City for the contract work satisfactorily completed and accepted by the County and/or the City, including such incremental acceptances of portions of such work. Any delay or postponement of payment over ten (10) days may occur only for good cause following written approval of the County and/or the City, as applicable, which approval shall not be unreasonably withheld, conditioned or delayed. This clause applies to both DBE and non-DBE subcontracts. Each subcontractor shall provide in all contracts with lower tier subcontractors or suppliers clauses requiring that the subcontractor shall pay the lower tier subcontractors and suppliers in accordance with the foregoing provisions. Any violation of these provisions by the prime contractor may be considered a breach of contract and may result in the suspension or termination of this contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and DOT. The foregoing requirements shall not be construed to limit or impair any contractual, administrative or judicial remedies otherwise available to the prime contractor or any subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontractor performance and/or noncompliance by a subcontractor.” [49 CFR Part 26.29]

4.6 Monitoring and Enforcement Mechanisms. [49 CFR Part 26.37]The County and the City will monitor DBE contracts, DBE scheduled work and payments to contractors related to the Banks Project in order to ensure compliance with this DBE Program and that work committed to DBEs at contract award is actually performed by DBEs. Non-compliance with this DBE Policy by the offending party may be considered a breach of contract and may result in the suspension or termination of that party’s contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and the DOT. The County and the City will bring to the attention of the DOT any false, fraudulent, or dishonest conduct in connection with the DBE Program known to the County or the City, as the case may be, as provided in 49 CFR Part 26.109. [49 CFR Part 26.37] The County and the City also will consider similar action under the County’s or the City’s own legal authorities granted through the contract documents, including responsibility determinations in future contracts.

4.7 Overall DBE Goals. [49 CFR Part 26.45]

(a) The County and the City, together with the Ohio Department of Transportation (“ODOT”), are required to and have established an overall goal for DBE participation in DOT-assisted contracts related to the Banks Project in accordance with the provisions of 49 CFR Part 26.45. The overall DBE participation goal must be based on demonstrable evidence of the availability of DBEs in the County which are ready, willing and able to participate in the DOT-assisted contracts relative to all businesses in the County which are ready, willing and able to participate in such contracts. The goal also must reflect the determination of the County, the City and ODOT of the level of DBE participation expected

absent the effects of discrimination. The overall goal for utilization of DBEs in connection with the publicly-funded portion of the Banks Project with respect to DOT-assisted contracts is _____% (the “DBE Goal”). [NOTE: DBE PARTICIPATION GOAL TO BE SET BY ODOT WITH RECOMMENDATION FROM THE COUNTY AND THE CITY.]

The Developer for the Banks Project fully supports the DBE Policy and the DBE Goal for the publicly-funded portion of the Banks Project.

(b) The County and the City will meet the maximum feasible portion of the DBE Goal by using *race-neutral* means to facilitate DBE participation in the Banks Project. The County and the City will attempt to achieve increased DBE participation in DOT-assisted contracts through *race-neutral* means, including, but not limited to, encouraging prime contractors to subcontract portions of the work on the Banks Project to DBEs, including work that such prime contractors otherwise might perform with their own work forces; ensuring the inclusion of DBEs and other small businesses on the County’s and/or the City’s mailing lists for bidders; and advising prime contractors of the County’s website and the City’s website with DBE information. [49 CFR Part 26.51(a)]

(c) The County and the City will use *contract goals* to meet any portion of the DBE Goal that the County and the City project cannot be met using *race-neutral* means. *Contract goals* shall be established so that, over the period to which the overall goal applies, the *contract goals* cumulatively will result in meeting any portion of the DBE Goal that is not projected to be met through the use of *race-neutral* measures. The County and the City will establish *contract goals* only on those DOT-assisted contracts that have subcontracting possibilities. The County and the City will not be required to establish *contract goals* on every such contract, and the size of *contract goals* will be adapted to the circumstances of each such contract (e.g., type and location of work, availability of DBEs to perform the particular type of work, etc.). [49 CFR Parts 26.51(d) and (e)] The County and the City will express *contract goals* as a percentage of the total amount of a DOT-assisted contract.

4.8 Good Faith Efforts. [49 CFR Part 26.53] When the County and/or the City has established a DBE *contract goal*, the County and/or the City will award the contract only to a bidder/offeror who makes good faith efforts to meet the goal as required under 49 CFR Part 26.53. Compliance with good faith efforts requirements will be treated as a matter of responsiveness to bid specifications. Each solicitation for which a *contract goal* has been established will require the bidders/offerors to submit the following information with each bid submitted:

- (a) The names and business and e-mail addresses of DBE firms that will participate in the contract;
- (b) A description of the work that each DBE firm will perform;
- (c) The dollar amount of the participation of each DBE firm participating;

(d) Written and signed documentation of commitment to use DBE subcontractors whose participation it submits to meet a ***contract goal***;

(e) Written and signed confirmation from each DBE firm that it is participating in the contract as provided in the prime Contractor's commitment; and

(f) If the contract goal is not met, evidence of good faith efforts of the bidder/offeror to meet such goal.

4.9 Counting DBE Participation. [49 CFR Part 26.55] The County and the City will count DBE participation towards overall and ***contract goals*** under the DBE Program as provided in 49 CFR Part 26.55.

4.10 DBE Certification. [49 CFR Part 26.83] Only firms certified as eligible DBEs as described in 49 CFR Part 26.83 are eligible to participate in the DBE Program.

5. SBE Policy Statement and Objectives

5.1 Policy and Objectives. The County and the City recognize that small businesses contribute financially to the County and the City through the payment of local taxes and the employment of local residents, who themselves support the County and the City through the payment of local taxes. The County and the City also acknowledge that small businesses generally have an economic and competitive disadvantage with respect to County and City contract and procurement opportunities because of their size and economic status. The County and the City believe that the growth and development of these economically-disadvantaged small businesses will increase the number of qualified business competitors in the local community, will improve and strengthen the local tax base which supports the County and the City, and will have a positive impact on the local workforce. It is the policy of the County and the City to support and encourage the participation of economically-disadvantaged small businesses in their procurement and contracting activities, including such activities related to the Banks Project (the "SBE Policy"). Accordingly, as part of the Banks Inclusion Policy, the County and the City have established the Banks Small Business Program (the "SBE Program") to encourage the participation of small businesses, directly and indirectly, in the contracts and procurements awarded by the County and/or the City related to the Banks Project. As part of the SBE Program, the County and the City also will encourage Contractors awarded Banks Project contracts to engage or use small businesses as subcontractors and/or suppliers for work to be performed under such contracts. Further, the County and the City will collect data to measure the participation of small businesses and minority and women-owned businesses in contracting and procurement activities related to the Banks Project. On an annual basis during the completion of the Banks Project, the County and the City will review this SBE Policy and the SBE Program and, if appropriate, will modify the policy and/or the program to more effectively achieve the objective of including small businesses in the contracting and procurement activities of the County and/or the City relating to the Banks Project.

5.2 Definitions. For purposes of this SBE Policy and the SBE Program, as used herein, “small business”, “small business enterprise” and “SBE” means a “small business enterprise” as defined under Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio, except that any requirement for the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) contained in such definition will not be applicable for purposes of the SBE Program. As used herein, “Contractor” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

5.3. SBE Participation Goals.

(a) In furtherance of the SBE Policy, it is the goal of the County and the City to award to small businesses, directly or indirectly through contracting, subcontracting and/or procurement activities of Contractors, contracts and procurements which represent at least 30% for Construction, 15% for Commodities and General Services and 10% for Professional Services, respectively, of the aggregate dollars spent annually by the County and/or the City on the Banks Project (the “SBE Goal”). In order to achieve the SBE Goal, the County and the City will encourage Contractors to use small businesses in the performance of contracts awarded to them relating to the Banks Project.

The Developer for the Banks Project fully supports the SBE Policy and the SBE Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve percentage goals equal to the SBE Goals with respect to the use of small business enterprises.

(b) The following categories are hereby established to identify the contracting and procurement activities covered by this SBE Policy, which categories may be amended from time to time by the County and the City:

(i) **Category A. – Construction:** including, without limitations, any and all contracts relating to new construction and the construction, renovation and/or maintenance of buildings, facilities and other erected structures owned or leased by the County and/or the City and the rehabilitation, remodeling and repairs of roads and bridges.

(ii) **Category B. – Commodities:** including, without limitations, the purchase of all goods, equipment, office and other supplies, art, furniture, and other tangible personal property otherwise not covered by Categories A, C and D herein.

(iii) **Category C. - General Services:** including, without limitations, the procurement of advertising, printing, non-construction repairs, janitorial services, training seminars and workshops, computer and information systems security, shipping and mailing, microfiche and microfilm, courier, storage, travel, consulting and any other non-professional services.

(iv) **Category D. – Professional Services:** including, without limitations, the purchase of any and all services for which applicable selection criteria may require a bidder or Contractor to possess a license or other certificate of competency, such as in the areas of accounting and auditing, insurance, laboratory, legal, medical and transportation, or as otherwise described as consultants in the Ohio Revised Code.

(c) Each Contractor for the Banks Project will be required to submit to the County and/or the City, as the case may be, with the Contractor's bid a plan for the engagement of small businesses by the Contractor in connection with the Banks Project. A Contractor's failure to submit a small business utilization plan to the County and/or City with the Contractor's bid may result in a determination that the bid is non-responsive and rejection of the bid.

(d) The County and/or the City may establish goals for the utilization of SBEs for each contract awarded by the County or the City, as the case may be, in connection with the Banks Project, and the goal related to each contract may differ from the goals for other contracts because of the availability of SBEs or other factors.

(e) The County and the City are required to award all contracts for the Banks Project to the "**lowest and best**" bidder. Accordingly, inability of a Contractor to meet the established contract goal or any other goal set forth in this SBE Policy with respect to the utilization of SBEs will not exclude the Contractor from award of a contract if the Contractor's bid otherwise is deemed by the County and/or the City, as the case may be, to be the "**lowest and best**" bid.

(f) For purposes of determining whether the SBE Goal is reached, SBE participation in Banks Project contracts will be counted as follows:

(i) The total dollar value of the contract awarded to an eligible SBE will be counted toward the SBE Goal;

(ii) The County or the City may count toward the SBE Goal a portion of the total dollar value of a contract with an eligible joint venture equal to the percentage of the ownership and contract of the SBE in the joint venture;

(iii) The County or the City may count toward the SBE Goal only expenditures to SBEs that perform a "**commercially useful function**" in the work of a contract. An SBE is considered to perform a "**commercially useful function**" when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. A business which stocks sufficient quantities of supplies in direct inventory, held for sale or resale, to cover anticipated future demands for the supplies engages in a "**commercially useful function**" for purposes of the SBE Program. SBEs that engage in the business of providing brokerage shall not be deemed to perform a "**commercially useful function**" unless the brokerage services are those required or sought by the County or the City, as the case may be. To determine whether an SBE is performing a commercially useful function, the County or the City, as the case may be, will evaluate the amount of work subcontracted, industry practices, and other relevant factors; and

(iv) Consistent with normal industry practices, an SBE may enter into subcontracts. If an SBE subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the SBE will be presumed not to be performing a commercially useful function. The SBE may present evidence to rebut this presumption to the County or the City, whichever has awarded the relevant contract.

5.4 Program Support. To facilitate the use of small businesses by Contractors, the County and the City, working together with the Consultant (as hereinafter defined), will:

5.4.1 Sponsor and hold pre-bid meetings to inform potential bidders of the SBE Goal and the availability of small businesses to perform work related to or to serve as suppliers for the Banks Project;

5.4.2 Notify small businesses of contracting, subcontracting and procurement opportunities related to the Banks Project directly and by placing notices and specifications related to such opportunities in their respective government bulletins; and, as funding permits, in major local newspapers in general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

5.4.3 Provide copies of bid notices to local trade associations, local small business chambers of commerce, technical assistance agencies and small business contractor associations;

5.4.4 Provide small businesses with information and list of resources relating to insurance, bonding and financing;

5.4.5 Encourage the formation of joint ventures among small businesses and between small businesses and prime Contractors which may provide an opportunity for small businesses to gain experience;

5.4.6 Make copies of specifications and requests for proposals available for review by any prospective bidder;

5.4.7 Conduct outreach events directed to small businesses regarding contracting procedures and specific contracting opportunities related to the Banks Project;

5.4.8 Make available a list of small business resources that may assist with the development and improvement of immediate and long-term business management, recordkeeping and financial and accounting capabilities; and

5.4.9 Develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of small businesses which are certified in accordance with this SBE Policy and which are available to serve as subcontractors and suppliers for the Banks Project, categorized by types of firms to facilitate identifying SBEs with capabilities relevant to a particular specification. Each SBE listing will contain the business name, contact person, mailing and e-mail addresses, phone number, legal structure of the business, and details concerning the SBE's specialty(ies). The directory will be continuously updated and maintained electronically as well as in hard copy. In compiling the directory, the County and the City will seek to identify and certify as many SBEs as possible that have the potential of doing business related to the Banks Project.

5.5 Monitoring SBE Participation.

(a) The County and the City will monitor and track the participation of small businesses in the Banks Project to determine if the SBE Goal is being met and whether Contractors are in compliance with the Non-discrimination Policy. In order to assist the County and the City in that effort, each Contractor for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) with each contract bid related to the Banks Project information regarding any and all small businesses proposed to be used by the Contractor in connection with the performance of the contract, including, but not limited to, a list of the name, business and e-mail addresses and telephone number of, and a brief description of the services to be performed or procurements to be filled (including the amount to be paid for such services or procurements) by, each such small business, which list also shall identify specifically each minority and women-owned business to be utilized in performing the contract if awarded to the Contractor; and

(ii) upon award of a contract related to the Banks Project, compile and deliver to the County and the City *monthly* reports regarding the engagement of small businesses in connection with the Banks Project in

sufficient detail so as to allow the County and the City to monitor and track the participation of small businesses in contract and procurement activities related to the Banks Project, including, but not limited to, a list of the name, business and e-mail addresses, telephone number and federal tax identification number of, and a brief description of the actual services performed or procurements filled by (including the amount paid or to be paid for such services or procurements), each small business during the period covered by the report in connection with the Banks Project contract or procurement awarded to such Contractor. In addition, for monitoring purposes, each such report shall identify specifically each minority and women-owned business included in the list.

(b) A Contractor's non-compliance with the foregoing disclosure or reporting requirements may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

(c) The County and the City at least annually will prepare or cause to be prepared a consolidated report based on a compilation and analysis of the reports submitted by the Developer and other information, if any, provided to the County and the City by Contractors, regarding the use of small businesses for contracts and procurements related to the Banks Project. The report also will discuss the use of minority-owned and women-owned businesses for services and procurements related to the Banks Project to the extent that such information is available to the County and/or the City. The report will be made available promptly to the general public on the County's and the City's websites as well as in hard copy upon request.

5.6 SBE Certification. For purposes of the Banks Project, only small businesses which are certified by the City pursuant to Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio will be eligible to participate in the SBE Program. Notwithstanding the foregoing, no requirement regarding the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) will be required for such certification.

5.7 Limitations. The provisions of this SBE Policy shall not apply to contracts or procurements valued at \$5,000 or less. In addition, the provisions of this SBE Policy shall not apply to the publicly-funded portion of the Banks Project to the extent that applicable federal and/or state laws, regulations or policies prohibit the application of this SBE Policy to such portion.

5.8 Application of Other SBE Policies. This SBE Policy and the SBE Program established pursuant hereto shall be applied to all contracts and procurements of the County and/or the City awarded or to be awarded in connection with the Banks Project in lieu of any other existing small business enterprise policy, program or contracting and procurement requirements of the County and/or the City.

6. Workforce Development Policy Statement and Objective [41 CFR Part 60]

6.1 Policy and Objectives. The County and the City are equal opportunity employers. The County and the City believe that the reduction in unemployment among local residents, particularly minorities and women, constitutes a valid local government purpose. The County and the City also recognize their obligation to use contracting and procurement activities to facilitate the creation of jobs for unemployed and underemployed individuals. In addition, a portion of the Banks Project will be financed by the federal government through DOT, which requires compliance with Executive Order No. 11246, as amended (the “Executive Order”), and regulations promulgated by the U. S. Department of Labor, Office of Federal Contract Compliance Programs (“OFCCP”), under 41 CFR Part 60 (the “DOL Regulations”). The Executive Order prohibits discrimination in employment and requires affirmative action by contractors and subcontractors to ensure equal employment opportunities without regard to race, color, sex, religion and/or national origin in performing non-exempt federally-assisted construction contracts and subcontracts. The Executive Order and the DOL Regulations apply to a construction contractor’s or subcontractor’s employees who are engaged in on-site construction, including those construction employees who work on a non-federally assisted construction site. It is the policy of the County and the City to comply, and to require all Contractors awarded contracts or subcontracts related to the Banks Project to comply, with the Executive Order and the DOL regulations (“Banks Workforce Policy”) to the extent applicable. Therefore, in order to increase the capacity of minorities and women to participate in local construction projects, to promote the employment of minorities and women in connection with the Banks Project and to comply with the Executive Order and the DOL regulations, as part of the Banks Inclusion Policy, the County and the City have established the Banks Workforce Development Program (the “Banks Workforce Program”). Each Contractor working on the publicly-funded portion of the Banks Project shall comply with all applicable provisions of the Executive Order, the DOL Regulations and all other rules, regulations, and relevant orders of the U. S. Secretary of Labor. For purposes of this policy, “**Contractor**” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

All terms used in this Banks Workforce Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in the Executive Order and/or the DOL Regulations.

6.2 Required Contract Clauses.

(a) Pursuant to the DOL Regulations, the equal opportunity clause published at 41 CFR Part 60-1.4(b) (the “Equal Opportunity Clause”) is required to be included in, and to be made a part of, all nonexempt federally-assisted construction contracts and subcontracts. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Equal Opportunity Clause in each of its contracts and subcontracts. The Equal Opportunity Clause shall be considered to be part of each contract and subcontract related to the

Banks Project required by the Executive Order or the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contract. [41 CFR Part 60-4.3(a)]

(b) The Standard Federal Equal Employment Opportunity Construction Contract Specifications published at 41 CFR Part 60-4.3(a) (the “Specifications”) are required to be included in, and to be made a part of, all federal and federally-assisted construction contracts in excess of \$10,000 to be performed in geographical areas designated by the Director of OFCCP (the “Director”) pursuant to 41 CFR Part 60-4.6 and in construction subcontracts in excess of \$10,000 necessary in whole or in part to the performance of nonconstruction federal contracts and subcontracts covered under the Executive Order. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Specifications in each of its contracts and subcontracts as may be required under the Executive Order and/or the DOL Regulations. The Specifications shall be considered part of each contract and subcontract required by the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contracts. [41 CFR Part 60-4.3(a)]

6.3 Affirmative Action Program. [41 CFR Part 60-1.40] Each nonconstruction Contractor awarded a contract by the County or the City related to the publicly-funded portion of the Banks Project, if the Contractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, shall develop and maintain a written affirmative action program for each of its establishments. Each Contractor awarded a contract or subcontract related to the Banks Project shall require each of its nonconstruction subcontractors, if the nonconstruction subcontractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, to develop and maintain a written affirmative action program for each of its establishments. An affirmative action program required by this section must comply with applicable DOL Regulations, must be developed within 120 days from the commencement of the awarded Banks Project related contract and must be updated annually. [41 CFR Part 60-1.40(a)] In order to comply with DOL Regulations, an affirmative action program must include the components specified in 41 CFR Parts 60-2.10(b) and 60-2.17, including placement goals for minorities and women. As part of its affirmative action program, a Contractor must conduct a workforce analysis of each job title, determine workforce availability of women and minorities for each job group, and conduct a utilization analysis to determine whether women or minority group persons are "underutilized" in any job group. Based on these analyses, the Contractor shall establish goals to overcome the underutilization of minorities and women and shall make a good faith effort to achieve those goals.

6.4 The Banks Project Workforce Participation Goals. [41 CFR Parts 60-4.3 and 60-4.6]

(a) Under the Executive Order and DOL Regulations, construction Contractors are not required to maintain a written affirmative action program, but must make *good faith efforts* to meet demographic goals related to geographic specific census data for minorities and a *nationwide* goal for women as determined by the Director or his designee. From time to time, the Director issues goals for minorities and women utilization based on appropriate workforce

demographic or other relevant data, which covers construction projects or construction contracts performed in specific geographical areas. The goals for minority and women participation in construction projects are expressed in percentage terms for the covered Contractor's aggregate workforce in *each* construction trade on *all* construction sites. The current percentage goal for the utilization of women established by the Director is 6.9% of work hours and applies to all of a Contractor's construction sites regardless of where the federal or federally-assisted contract is being performed. Minority utilization goals are formulated in terms of work hours performed in a specific Standard Metropolitan Statistical Area ("SMSA") or Economic Area, and the specified goals apply to all of a Contractor's work in the SMSA, both federally-assisted and private construction work. Therefore, the current goals for minorities and women participation in the workforce for the Banks Project as established by the Director are as follows:

	Goal for minority participation in each trade	Goal for women participation in each trade
For Hamilton County:	11.0%	6.9%
For City of Cincinnati:	11.0%	6.9%

It is the aim of the County and the City to achieve the workforce participation goals with respect to the Banks Project as set forth above. In addition, based upon current labor force information, the County and the City have established a combined goal for the participation of minorities and women in the workforce for the Banks Project of 22% (the "Workforce Participation Goals").

The Developer for the Banks Project fully supports this Banks Project workforce policy (the "Banks Workforce Policy") and the Workforce Participation Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve significant participation of minorities and women as measured in labor hours.

(b) In accordance with the Executive Order and the DOL Regulations, the Workforce Participation Goals apply to a covered Banks Project construction Contractor's total construction workforce in the SMSA, even if some of the Contractor's employees perform work under non-federal or nonfederally-assisted construction contracts or subcontracts and even though such work may occur in geographical areas where the Contractor does not currently work on federal or federally-assisted construction projects. The goals applicable to other construction work performed by a Contractor outside of the SMSA (which includes the County and the City) are the goals established by the Director for those geographic areas where such other construction work is being performed.

6.5 Good Faith Efforts. [41 CFR Part 60-4.3]

(a) In order to achieve the Workforce Participation Goals, construction Contractors working on the publicly-funded portion of the Banks Project are required to use their *good faith efforts* to increase the utilization of minorities and women in the skilled construction trades. Further, pursuant to the Executive Order and DOL Regulations, construction Contractors working on the publicly-funded portion of the Banks Project must take certain action to

demonstrate their *good faith efforts* to achieve the Workforce Participation Goals, including, but not limited to:

6.5.1 Maintaining a work environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work;

6.5.2 Establishing and maintaining current lists of minority and women recruitment sources; providing written notification to minority and women recruitment sources and to community organizations when the Contractor has employment opportunities available; and maintaining a record of the organizations' responses;

6.5.3 Maintaining current files containing the names, residence and e-mail addresses and telephone numbers of each minority or woman off-the-street applicant and minority or woman referral from a union, recruitment source or community organization and of what action was taken with respect to each such individual;

6.5.4 Developing on-the-job training opportunities and/or participating in training programs for the area which expressly include minorities and women, and providing notice of these training opportunities and job programs to recruitment sources, state employment offices and other referral sources compiled by the Contractor as required under DOL Regulations;

6.5.5 Disseminating the Contractor's equal employment opportunity policy to unions and training programs, requesting their cooperation and assistance in meeting equal employment opportunity obligations, and disseminating the Contractor's equal employment opportunity policy by including it in the Contractor's policy manual or collective bargaining agreement, by publicizing it in the Contractor's newspaper, annual report , etc. (if any), by specific review of the policy with all management personnel and with all minority and women employees at least once a year, and by posting the Contractor's equal employment opportunity policy on bulletin boards accessible to all employees at each location where the construction work is performed;

6.5.6 Disseminating the Contractor's equal employment opportunity policy in advertising and in the news media of general circulation (including minority and women news media);

6.5.7 Directing recruitment efforts, both oral and written, to minority, women and community organizations, to schools with minority and female students and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs;

6.5.8 Encouraging current minority and women employees to recruit other minorities and women; and

6.5.9 Documenting and maintaining records of all solicitations of offers for subcontracts from minority and women construction contractors and suppliers, including circulating solicitations to minority and women contractor associations and other business associations.

(b) Although Contractors are required to make *good faith efforts* to meet the Workforce Participation Goals, the goals are neither quotas, set-asides nor a device to achieve proportional representation or equal results. The Workforce Participation Goals are not intended to require a Contractor to hire a person who does not have the qualifications needed to perform the assigned job successfully, to hire an unqualified person in preference to another applicant who is qualified, or to hire a less qualified person in preference to a more qualified person. Rather the goals are used to target and measure the effectiveness of affirmative action efforts to eradicate and prevent barriers to equal employment opportunities related to the Banks Project, and no sanctions will be imposed on a Contractor solely for failure to meet the Workforce Participation Goals.

(c) To promote and facilitate such employment, the County and the City, working together and through the Consultant (as hereinafter defined) and/or the Southwest Ohio Regional Workforce Investment Board (the “SWORWIB”), which is funded jointly by the County and the City, will:

6.5.10 Sponsor and hold pre-bid meetings to inform potential bidders of the Workforce Participation Goals and the availability of qualified minorities and women to work on the Banks Project;

6.5.11 Notify minorities and women of employment opportunities related to the Banks Project by placing notices of such opportunities in their respective government bulletins, on their respective websites and, as funding permits, in major local newspapers of general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

6.5.12 Provide copies of notices of employment opportunities related to the Banks Project to local minority and women trade associations, local minority and women chambers of commerce, technical assistance agencies, employment agencies, community resource organizations and minority and women contractor associations;

6.5.13 Work with various community-based/workforce development programs that provide instruction and training opportunities for minorities and women interested in gaining experience in construction and related fields to establish a job readiness program for, and to increase the pool of minorities and women qualified to work on, the Banks Project;

6.5.14 Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, educational associations, and local community organizations who provide workforce development programs to identify minorities and women interested in pursuing careers or jobs in the construction industry; and

6.5.15 Implement pre-apprenticeship programs to develop the skill levels of minorities and women interested in pursuing jobs in the construction industry.

In addition, working together and through the SWORWIB, the County and the City will use their best efforts to develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of qualified minority and women construction and other workers available for employment related to the Banks Project, categorized by types of experience and skills to facilitate identifying minorities and women with skills and capabilities relevant to particular job requirements. To the extent permissible by law, each listing will contain the name, residence and e-mail addresses, telephone number, and details concerning the job qualifications of each individual. The directory will be continuously updated and maintained electronically as well as in hard copy.

(d) The Workforce Participation Goals established herein are interim and designed to be reasonably attainable. The County and the City will review the Workforce Participation Goals at least annually and, if legally permissible and appropriate, based upon the relevant facts and circumstances, from time to time, the County and the City may modify or adjust the Workforce Participation Goals.

6.6 Monitoring the Banks Project Workforce Participation.

(a) The County and the City, working together and through the Consultant, will monitor and track the participation and employment of minorities and women as construction and other workers in connection with the Banks Project to determine if the Workforce Participation Goals are being met. In order to assist the County and the City in that effort, each Contractor awarded a contract for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) promptly after such award information regarding the number of full and part-time employees of the Contractor who will work on the Banks Project, identifying such employees who are minorities and women, including, but not limited to, a list of the name, residence and e-mail addresses, and telephone number of, and a brief general description of the work to be performed by, each such employee, information regarding whether the Contractor expects to hire additional employees to work on the Banks Project and, if so, a brief general description of the skills and capabilities requirements for each such additional employee; and

(ii) compile and deliver to the County and the City *monthly* reports regarding the employment, if any, of additional minorities and women to work on the Banks Project.

(b) A Contractor's non-compliance with the requirements of the Executive Order, the DOL Regulations, this Banks Workforce Policy or the Banks Workforce Program, as

such provisions are applicable with respect to the publicly-funded portion of the Project, may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

6.7 Limitations. The provisions of this Banks Workforce Policy and the Banks Workforce Program shall not apply to a Contractor with a federally-assisted construction contract or subcontract valued at \$10,000 or less. [40 CFR 60-4.1]

7. Employee Readiness Program

7.1 Establishment. In order to accomplish the Workforce Participation Goals, the County and the City, working together and with the SWORWIB, will cause to be established an employee readiness program (the "ERP") to work in conjunction with various community-based workforce development programs to increase the construction skill levels of County and City residents and to help them reach the qualification levels needed to gain entry into union and open shop apprenticeship programs. Additional details regarding the role and make-up of the ERP are set forth in Schedule A attached. To facilitate this effort, the County and the City, working together and through the Consultant, will:

(a) Coordinate with various community-based workforce development programs that provide instruction and training opportunities for those interested in gaining experience in construction industry and related fields;

(b) Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, and educational associations and organizations to identify and engage those interested in pursuing careers in the construction industry and related fields; and

(c) Advertise and promote the availability of workforce project opportunities in a broad-based manner.

7.2 Employee Readiness Committee. The County and the City endorse the work and efforts of the SWORWIB and will encourage the SWORWIB to establish an employee readiness committee (the "ERC") to oversee implementation of the ERP. The purpose of the ERC will be to evaluate the effectiveness of the ERP and new and existing apprenticeship programs which are available to residents of the County and/or the City. The membership of the ERC should include an elected official, Contractors, union and non-union officials, a SWORWIB member, and apprenticeship representatives. The ERC should provide input and recommendations to the SWORWIB and, in turn, the SWORWIB should report quarterly to the County, the City and the Consultant about the progress and effectiveness of the ERP.

8. Inclusion Outreach Consultant

8.1 Engagement of Consultant. In order to facilitate the implementation and administration of this Banks Inclusion Policy, including the DBE Program, the SBE Program and the Banks Workforce Program, the County, the City and the Developer will hire an inclusion outreach consultant (the “Consultant”) to assist with the Banks Project. The Consultant will be responsible for conducting extensive outreach programs directed at DBEs, including minority and women-owned businesses, SBEs, and qualified minorities and women construction workers, during the preconstruction and construction phases of the Banks Project. The Consultant also will be responsible for tracking, monitoring and preparing monthly participation reports on the utilization of DBEs, including minority and women-owned businesses, SBEs and qualified minorities and women construction workers in connection with the Banks Project.

8.2 Other Duties of Consultant. The Consultant will work cooperatively with the Hamilton County Office of Small Business Development (the “Small Business Development Office”), and the City of Cincinnati Office of Contract Compliance (the “COCC”) in connection with the implementation and administration of this Banks Inclusion Policy. In addition, the Consultant will seek input and advice regarding effective outreach efforts as contemplated by this Banks Inclusion Policy from business leaders, DBEs, small business owners and representatives of trade associations and community organizations, including, but not limited to, the Greater Cincinnati & Northern Kentucky African American Chamber of Commerce, the Cincinnati USA Hispanic Chamber of Commerce, the Cincinnati USA Regional Chamber of Commerce, the Greater Cincinnati Building & Construction Trades Council, Allied Construction Industries (ACI), Ohio Valley Chapter of Associated Builders and Contractors, Inc., South Central Ohio Minority Business Council, Cincinnati Women In Construction, Cincinnati Business Incubator, the Cincinnati Minority Contractors Business Assistance Program, the Cincinnati-Hamilton County Community Action Agency, the Cincinnati Unit of the NAACP, the Hamilton County Department of Job and Family Services and the Cincinnati Workforce Development Center.

9. Socio-Economic Impact

9.1 Data Collection and Analysis. The County and the City anticipate that the Banks Project will have a significant and positive social and economic impact on the Greater Cincinnati and Hamilton County region. The County and the City also believe that it is important to measure such impact, particularly in the census tract areas within the SMSA that includes the County and the City (the “Hamilton County SMSA”) which have been deemed to be economically distressed. For that purpose, the County and the City will collect and analyze social and economic data to monitor and measure the regional impact of the Banks Project. To assist the County and the City and to facilitate such efforts, each Contractor for the Banks Project will be required to:

(a) prepare and submit to the awarding government entity (the County or the City, as appropriate) quarterly reports regarding:

(i) the use of first-tier subcontractors, suppliers and vendors in connection with the Banks Project during the period covered by the report, including, but not limited to, (i) the name and principal business address of each subcontractor, supplier and vendor and (ii) the dollar value of each Banks Project related subcontract and procurement awarded by the Contractor to the first-tier subcontractor, supplier or vendor during the covered period; and

(ii) the number of persons employed by the Contractor to work on the Banks Project (or to perform any work directly or indirectly related to the Banks Project) during the covered period who reside in the SMSA which includes Hamilton County, together with the aggregate amount of salaries and gross wages paid to such persons, based upon each zip code included in such geographic area.

Each Banks Project related subcontract between a Contractor and a first-tier subcontractor, supplier or vendor shall require the subcontractor, supplier or vendor to prepare and submit to the government entity that awarded the prime contract or procurement to the Contractor (the County or the City, as appropriate) quarterly reports containing information as described or otherwise required pursuant to this provision with respect to the subcontractor's first-tier subcontractor supplier or vendor contract, procurement and/or employment activities related to such awarded subcontract or procurement.

9.2 Limitations. The provisions of Section 9.01 shall not apply to individual Banks Project related contracts, subcontracts and/or procurements valued at \$10,000 or less, unless or until the aggregate value of a series of such contracts, subcontracts and/or procurements awarded to the same Contractor, subcontractor, supplier or vendor exceeds \$10,000. The information described under Section 9.01(a)(ii) shall not be required for a supplier or vendor that does not have any office, supply warehouse or distribution facility located within [50] miles of the County.

10. Rules and Guidelines

10.1 Authorization. The Small Business Development Office and the COCC are authorized to jointly prepare and issue rules and guidelines for the implementation and administration of this Banks Inclusion Policy consistent with the purposes and intent of such policy as set forth herein. Nothing set forth herein or in such rules and guidelines should be interpreted or applied in any manner that would be in violation of existing applicable state or federal law. [Accordingly, the Banks Project Small Business Enterprise Program Rules and Guidelines dated _____, 2007 have been developed by the Small Business Development Office and the COCC and specifically apply to this Banks Inclusion Policy.]

SCHEDULE A

Employee Readiness Program

[TO BE ATTACHED]

**The Banks - Phase 3B Public Infrastructure Development Parking Garage And Street Grid
Monthly Workforce Tracking Form**

Contractor Name:		Contract Value:		Trade Contract #:		Pay Application #:	
Date Submitted:		Business Type: (Circle all that apply)	SBE *BSBE MBE WBE DBE NONE				
Contact Person:		Reporting Dates:	From:		To:		
Address:		Federal Tax ID Number:					
City/State/Zip Code:		County:					
Telephone Number:		Email:					
Trade Contract Description:		Circle Appropriate Box:	<input type="checkbox"/> Contractor <input type="checkbox"/> Subcontractor				

The Banks Monthly Workforce

Job Categories Trade Employees		Total Employee Hours Worked				Total Minority (Hours)				Caucasian (Hours)		African American (Hours)		Asian American (Hours)		Hispanic American (Hours)		Native American (Hours)	
	Total Hours	Total Male Hours	Total % Male	Total Female Hours	Total % Female	Minority Male Hours	Total % Male Minority	Minority Female Hours	Total % Female Minority	Caucasian Male Hours	Caucasian Female Hour	African American Male Hours	African American Female Hours	Asian American Male Hours	Asian American Female Hours	Hispanic American Male Hours	Hispanic American Female Hours	Native American Male Hours	Native American Female Hours
FOREPERSON	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EQUIPMENT OPERATORS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MECHANICS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCK DRIVERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IRONWORKERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CARPENTERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CEMENT MASONS (and CONCRETE FINISHERS)	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ELECTRICIANS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PIPEFITTERS/PLUMBERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAINTERS	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABORERS-SEMI SKILLED	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LABORERS-UNSKILLED	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.00	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Authorized Contractor Representative Signature:	Title:	Date:

The Banks - Public Infrastructure Development Parking Garage and Street Grid

Instructions Form WF-01

WF-01 Number of Employee Hours Report

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Business Status:	Indicate the Contractor's business status. Circle all which apply (if applicable)
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zipcode:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractors designated contact person
Trade Contract Description:	Indicate the description of the Contractor's work on this project
Job Category Trade Employees:	Indicate the job category of the trade employees working on the project
Total Employee Hours Worked:	Indicate the total number of employees hours worked for the time period covered by this report
Total Minority/Female Hours:	Indicate the total number of hours worked by minority and female employees for the period covered by this report
Caucasian Hours:	Indicate the total number of employees hours worked for Caucasian employees
African American Hours:	Indicate the total number of employees hours worked for African American employees
Asian American Hours:	Indicate the total number of employees hours worked for Asian American employees
Hispanic American Hours:	Indicate the total number of employees hours worked for Hispanic American employees
Native American Hours:	Indicate the total number of employees hours worked for Native American employees
Male/Female:	Indicate the number or % of male or female employees for the time period covered by this report
Foreperson:	Indicate the number of employees identified as Foreperson's working on this project
Equipment Operators:	Indicate the number of employees identified as Equipment Operators working on this project
Mechanics:	Indicate the number of employees identified as Mechanics working on this project
Truck Drivers:	Indicate the number of employees identified as Truck Drivers working on this project
Ironworkers:	Indicate the number of employees identified as Ironworkers working on this project
Carpenters:	Indicate the number of employees identified as Carpenters working on this project
Cement Mason(and Concrete Finishers):	Indicate the number of employees identified as Cement Masons(and Concrete Finishers) working on this project
Electricians:	Indicate the number of employees identified as Electricians working on this project
Pipefitter/Plumber:	Indicate the number of employees identified as Pipefitters/Plumbers working on this project
Painters:	Indicate the number of employees identified as Painters working on this project
Laborer-Semi Skilled:	Indicate the number of employees identified as Laborers-Semi Skilled working on this project
Laborers -Unskilled:	Indicate the number of employees identified as Laborers-Unskilled working on this project
Grand Totals:	Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

FOREPERSON - Directly supervise and coordinate activities of construction. (Sample: Construction Foreman, Construction Superintendent, Construction Supervisor, Field Supervisor, Foreman, Job Superintendent, Project Superintendent, Site Superintendent, Superintendent, Supervisor)

EQUIPMENT OPERATORS - Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.) Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators and stone spreader operators. (Sample: Equipment Operator (EO), Paver Operator, Roller Operator, Truck Driver, Operator, Screed Operator, Heavy Equipment Operator, Maintenance Equipment Operator (MEO), Asphalt Raker, Asphalt Paver Operator.)

MECHANICS - Operate on one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.)

TRUCK DRIVERS – Heavy and Tractor-Trailer Truck Drivers - Drive a tractor trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license. (Sample: Truck Driver, Driver, Over the Road Driver (OTR Driver), Line Haul Driver, Delivery Driver, Owner Operator, Road Driver, Semi Truck Driver, City Driver, Feeder Driver)

IRONWORKERS - Structural Iron and Steel Workers - Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings. (Sample: Ironworker, Iron Worker, Fitter / Welder, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand) Reinforcing Iron and Rebar Workers - Position and secure steel bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches and hand tools. Includes rod busters. (Sample: Ironworker, Rod Buster, Iron Worker, Steel Tier, Field Ironworker, Reinforced Ironworker, Rodman)

CARPENTERS - Construct, erect, install, or repair structures and fixtures made of wood, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors. May also install cabinets, siding, drywall and batt or roll insulation. Includes brattice builders who build doors or brattices (ventilation walls or partitions) in underground passageways. Construction Carpenters - Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools. (Sample: Carpenter, Lead Carpenter, Assembler, Finish Carpenter, Construction Worker, Custom Stair Builder, Installer, Production Worker, Trim Carpenter, Concrete Carpenter) Rough Carpenters - Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions. (Sample: Carpenter, Apprentice Carpenter, Form Carpenter, Journeyman Carpenter, Rough Carpenter, Union Carpenter, Bridge Carpenter, Bridge Repair Crew Person)

CEMENT MASON(and Concrete Finishers) - Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints. (Sample: Concrete Finisher, Cement Finisher, Cement Mason, Finisher, Mason, Concrete Mason.)

ELECTRICIANS - Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. (Sample: Chief Electrician; Control Electrician; Electrician; Industrial Electrician; Inside Wireman; Journeyman Electrician; Journeyman Wireman; Maintenance Electrician; Mechanical Trades Specialist, Electrician; Qualified Craft Worker, Electrician (QCW, Electrician)

PIPEFITTER/PLUMBER- Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters. (Sample: Pipe Fitter, Pipefitter, Welder, Steamfitter, Sprinkler Fitter, Equipment Service Associate (ESA), Machine Repairman, Journeyman Pipefitter, Millwright, Pipe Welder.) Assemble, install, or repair pipes, fittings, or fixtures of heating, water, or drainage systems, according to specifications or plumbing codes. (Sample: Commercial Plumber; Drain Cleaner, Plumber; Drain Technician; Journeyman Plumber; Master Plumber; Plumber; Plumber Gasfitter; Plumbing and Heating Mechanic; Residential Plumber; Service Plumber)

PAINTERS - Paint walls, equipment, buildings, bridges, and other structural surfaces, using brushes, rollers, and spray guns. May remove old paint to prepare surface prior to painting. May mix colors or oils to obtain desired color or consistency. (Sample: Painter, Facilities Painter, Maintenance Painter, Highway Painter, Industrial Painter)

LABORERS-SEMI SKILLED – Having or requiring more training and skill than unskilled labor but less than skilled. Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris and other waste materials. May assist other craft workers. (Sample: Construction Laborer, Construction Worker, Curb and Gutter Laborer, Drain Layer, Drop Crew Laborer, Helper, Laborer, Post Framing, Skill Labor, Union Laborer)

LABORERS UNSKILLED – All non-classified laborers. Any miscellaneous job classifications are to be incorporated in the most appropriate category listed on the form. All employees on the project should be accounted for.

The Banks - Phase 3B Public Infrastructure Development Parking Garage and Street Grid

Number of Employees Report

Contractor Name:		Contract Value \$:			
Date Submitted:		Reporting Dates:	From:		To:
Contact Person:		Pay Application #:			
Address:		County:			
City/State/Zip Code:		Business Type:			
Telephone Number:		Federal Tax ID:			
Trade Contract Description:		Contact Email:			

Number of Employees

	Total Number of Employees	Caucasian Men		Women		Minority		Caucasian		African American		Asian American		Hispanic American		Native American	
		Total Number of Caucasian Men	Percentage of Total Employees	Total Number of Women	Percentage of Total Employees	Total Number of Minority Men and/or Women	Percentage of Total Employees	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Joint Policy Questions																	
Total number of employees working on this Banks contract?	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of full-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of part-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of employees working on Banks contractor (who perform work directly or indirectly) who lives in the Cincinnati Middletown MSA [9.1 (a) (ii)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of all employees working within this MSA (All employees in company)	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0

****Note minority female workers count in both the women and minority columns but only once in the total number of employees column.**

Do you expect to hire additional employees to work on The Banks Project?

YES

NO

If so, please provide a general description of the skills and capability requirements for each additional employee

Authorized Contractor Representative:

Signature

Title

Date

The Banks - Public Infrastructure Development Parking Garage and Street Grid

Instructions Form WF-02

WF-02 Monthly Workforce Tracking Form

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zip code:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractors designated contact person
Total # of Employees:	Indicate the total number of participants who worked on this contract
Total # of Caucasian Men:	Indicate the total participation of Caucasian men working on this contract
Total Percent of Caucasian Men:	Indicate the total percentage of Caucasian men working on this contract
Total # of Women:	Indicate the total participation of females working on this contract
Total Percent of Women:	Indicate the total percentage of females working on this contract
Total # of Minorities:	Indicate the total participation of minorities working on this contract
Total Percent of Minorities:	Indicate the total percentage of minorities working on this contract
Caucasian Men :	Indicate the total number of Caucasian men working on this contract
Caucasian Women :	Indicate the total number of Caucasian women working on this contract
African American Men:	Indicate the total number of African American men working on this contract
African American Women:	Indicate the total number of African American women working on this contract
Asian American Men:	Indicate the total number of Asian American men working on this contract
Asian American Women:	Indicate the total number of Asian American women working on this contract
Hispanic American Men:	Indicate the total number of Hispanic American men working on this contract
Hispanic American Women:	Indicate the total number of Hispanic American women working on this contract
Native American Men:	Indicate the total number of Native American men working on this contract
Native American Women:	Indicate the total number of Native American women working on this contract
Total # Minority and/or Women:	Indicate the combined total of minorities and women working on this contract
Percentage of Total Employees:	Indicate the combined percentage of minorities and women working on this contract
Grand Totals:	Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

The Banks - Public Infrastructure Development Parking Garage and Street Grid											
Monthly Subcontractor Utilization Report											
Contractor Name:								Type of Inclusion Program:		SBE or DBE	
Date Submitted:								Contractor Pay Application #:			
Contact Person:								Reporting Period From:		To:	
Contractor Address:								Business Type: (Circle all that apply)		*Banks SBE SBE MBE WBE **DBE None	
Contractor City/State/Zip Code:								County:			
Telephone Number:								Federal Tax ID:			
Trade Contract Description:								Email Address:			
Employee Information Form											
Employee Name	Minority		Female		Full or Part Time		Home Address	Last 4 digits of Social Security #	Minority Classification	County	Job Trade Category
	(Circle Y or N)		(Circle Y or N)		(Circle FT or PT)						
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					

*The Banks SBE - An SBE certified by the City of Cincinnati Economic Inclusion

**The Banks DBE - A DBE certified through the Ohio DBE Unified Certification Program

***Column should reflect the information entered on form AIA Document G703 column E

The undersigned certifies that the information recorded above is correct, and that each of the representations set forth above is true. The undersigned further acknowledges that any misrepresentation hereon may result in termination of contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims.

Authorized Contractor Representative:

Signature

Title

Date

**The Banks - Public Infrastructure Development Parking Garage and Street Grid
Instructions Form WF-03**

WF-03 Monthly Employee Report

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Business Type:	Indicate the Contractor's business status. Circle all which apply (if applicable)
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zipcode:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractor's designated contact person
Trade Contract Description:	Indicate the description of the Contractor's work on this project
Employee Name:	Indicate the name of employee working on this project
Minority:	Indicate whether the employee belongs to an ethnic minority group - Circle Response - Yes or No
Female:	Indicate whether the employee is female of any ethnic group - Circle Response - Yes or No
Full/Part Time:	Indicate whether the employee is working in a full time or part time capacity - Circle Response - FT or PT
Home Address:	Indicate the home address of the employee
Last 4 Digits of Employee Social Security #:	Indicate the last 4 social security numbers of the employee
Minority Classification:	Indicate the minority classification of the employee (if applicable)
County:	Indicate the county of the employee
Job Category Trade Employees:	Indicate the job category of the trade employees working on the project
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

Consolidated Metropolitan Statistical Area (CMSA) OH-KY-IN

40006	40011	40045	40055	40075	40355	40359	40363	40379	41001
41003	41005	41005	41006	41007	41008	41010	41011	41012	41014
41017	41018	41019	41021	41025	41030	41033	41034	41035	41040
41043	41044	41045	41046	41051	41052	41053	41054	41055	41056
41062	41063	41071	41072	41073	41074	41075	41076	41083	41085
41086	41092	41094	41095	41096	41097	41098	41099	45001	45002
45003	45004	45005	45011	45012	45013	45014	45015	45018	45030
45032	45033	45034	45036	45039	45040	45041	45042	45044	45050
45051	45052	45053	45054	45055	45056	45061	45062	45063	45064
45065	45066	45067	45068	45069	45071	45101	45102	45103	45105
45106	45107	45111	45112	45113	45114	45115	45118	45119	45120
45121	45122	45123	45130	45131	45132	45133	45135	45140	45142
45144	45146	45147	45148	45150	45152	45153	45154	45155	45156
45157	45158	45159	45160	45162	45164	45166	45167	45168	45169
45171	45172	45174	45176	45177	45201	45202	45203	45204	45205
45206	45207	45208	45209	45211	45212	45213	45214	45215	45216
45217	45218	45219	45220	45221	45222	45223	45224	45225	45226
45227	45229	45230	45231	45232	45233	45234	45235	45236	45237
45238	45239	45239	45240	45241	45242	45243	45244	45245	45246
45247	45248	45249	45250	45251	45252	45253	45254	45255	45258
45262	45263	45264	45267	45268	45269	45270	45271	45273	45274
45275	45277	45280	45296	45298	45299	45335	45458	45612	45616
45618	45650	45657	45660	45671	45679	45684	45693	45697	45999
47001	47003	47006	47010	47011	47012	47016	47018	47019	47020
47021	47023	47024	47030	47031	47033	47034	47035	47036	47037
47038	47039	47040	47041	47042	47043	47060	47224	47250	47325
47331	47353	47357							

**The Banks – Public Infrastructure Development Parking Garage and Street
Grid SBE Subcontractor Utilization Plan**
Bid or Proposal Reference Number: _____

Contract Description:	Total Bid Amount: \$	Date submitted:
Contractor Name/Address/City/State/Zip/Phone:	Federal Tax ID Number:	Type of Inclusion Program (circle one): SBE DBE

Contractor is certified by the City of Cincinnati Office of Contract Compliance as an SBE and meets the SBE participation goals without using other SBEs:	Yes	or	No
OR			
Contractor is certified through the Ohio DBE Unified Certification Program as a DBE and will self-perform _____% of the DBE participation goal.	Yes	or	No

The above named Contractor proposes to use the services of the following listed subcontractor/supplier(s) demonstrating sufficiency to meet or exceed the SBE/DBE participation goal. The contractor must list all SBEs/DBEs, regardless of contract amount or type of service. Failure to complete this form with all the requested information (as indicated in each column) may cause a bid or proposal to be determined non-responsive.

Name/Address/City/State Zip/Phone	Federal Tax ID#	Describe Exact Type Of Work /Supplier	Subcontract Dollars	Subcontract/Supplier Percentage of Contractors Total Bid Amount	FOR OFFICE USE ONLY (SBE/DBE CALCULATION)

The Contractor certifies that the above information is true to the best of its knowledge. The Contractor acknowledges and agrees that, if awarded the contract, the information provided on this Form 2003 shall be incorporated into the terms and conditions of the final contract between the Owner and the Contractor, as long as the Subcontractor(s) meet the approval of the Owner (see Form 2004). Contractor acknowledges and agrees that any changes to the above information, after the contract is awarded, must be submitted in writing on the Substitution Form 2006 and approved in advance by the Owner.

CONTRACTOR REPRESENTATIVE (SIGNATURE): _____

PRINTED NAME: _____ **Title:** _____ **Date:** _____

If Additional Space is Needed, Please Use Copies of This Form.

Bid Submission Document	Print Legibly or Type
-------------------------	-----------------------

The Banks – Public Infrastructure Development Parking Garage and Street Grid

Statement of Good Faith Efforts

Bid or Proposal Reference Number: _____ Type of Inclusion Program: SBE or DBE

By the signature below of an authorized representative, Contractor certifies that Contractor has utilized the following methods to obtain the maximum practical participation by Small Business Enterprises (SBEs) certified by the City of Cincinnati Office of Contract Compliance or Disadvantaged Business Enterprises (DBEs) certified through the Ohio DBE Unified Certification Program. Please indicate which methods used by placing an X in the appropriate space.

YOU MUST SUBMIT YOUR SUPPORTING DOCUMENTATION WITH YOUR BID. NEW INFORMATION WILL NOT BE ACCEPTED AFTER THE BID CLOSING DATE.

1. ____ Identified sufficient subcontracting work to meet goal (attach content of advertisements and written notices to SBEs/DBEs indicating type of work to be subcontracted).
2. ____ Bidder has coordinated SBE/DBE inclusion efforts with the Economic Inclusion Consultant, Messer Construction Co. (513-482-5419 or swalton@messer.com) to ascertain the availability of SBE/DBE subcontractors/subconsultants/suppliers for the scopes of work.
3. ____ Advertising - Attach content of advertisements, which must include project name, Contractor's name, work available, contact person's name and number, information on availability of plans and specifications and Contractor's policy concerning assistance to SBEs/DBEs in obtaining bonding, financing, and/or insurance; also provide date of advertising and names of publications.
4. ____ Written notice to SBEs/DBEs for subcontracting opportunities (submit copy of each letter sent, confirmation of receipt by SBE/DBE, or if available master notification, submit copy of letter and recipient list).
5. ____ Notice described in item 4., above, was sent at least five (5) business days prior to the bid opening date.
6. ____ Follow-up initial solicitations, attach copies of Outreach/Good Faith Summary Sheet (Form 2007-A).
7. ____ Assistance with securing bonding, financing and/or insurance (submit copy advertising and written notice to SBEs/DBEs).
8. ____ Provision of plans, specifications and requirements: Contractor provided interested SBEs/DBEs with access to plans, specifications and requirements for subject project.
9. ____ Provide documentation detailing reason(s) why agreement was not reached with SBEs/DBE (s) who responded affirmatively in writing. Include written explanation for rejection of SBE/DBE proposals.
10. ____ Other (Please list any other methods utilized that are not covered above):

Name of Contractor

Contractor Representative (Signature)

Date

Contractor Representative (Printed Name)

Title

**The Banks – Public Infrastructure Development Parking Garage and Street Grid
SBE Outreach & Good Faith Efforts Summary Sheet**

Bid or Proposal Reference Number: _____

Contractor/Consultant Name:			Address/City/State/Zip/Telephone:		
Bid/Proposal Name:			Bid/Proposal Due Date:		Type of Bid Package: DBE or SBE
SBE Subcontractor/ Supplier's (Name/Address/ City/State/Zip)	Type of Work/Supplies Solicited	Indicate Date and How SBE Contacted (e.g., Letter, Phone, Fax, etc)	SBE Response to Solicitation (e.g., Will Submit Bid, No Response, Not Interested) and Date	Contact Person	Phone Number

Please list above the name(s) of all firms contacted and their responses to the specified proposal or bid package. If additional space is required this form may be duplicated.

I hereby certify that the above information is true and accurate:

Contractor Representative Signature

Print Name/Title

Date

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

DOCUMENT 001000.15

**WARRANTY AGAINST AN
UNRESOLVED FINDING FOR RECOVERY**

In accordance with Section 9.24 of the Ohio Revised Code, the undersigned hereby warrants that the Contractor is not subject to an unresolved finding for recovery under ORC 9.24.

CONTRACTOR'S NAME

SIGNATURE

PRINT NAME

TITLE

TO BE COMPLETED BY NOTARY PUBLIC

On _____, there appeared before me
DATE

_____, saying that he/she is
PRINT NAME

_____ of ,
PRINT TITLE

PRINT NAME OF CONTRACTOR

and that he/she understands all of the implications of the above statement and has signed in good faith.

SIGNATURE OF NOTARY PUBLIC

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Bid Submission Documents
Complete & Submit With Bid

Ohio Department of Public Safety
Division of Homeland Security
<http://www.homelandsecurity.ohio.gov>
DOCUMENT 001000.16

GOVERNMENT BUSINESS AND FUNDING CONTRACTS

In accordance with section 2909.33 of the Ohio Revised Code

**DECLARATION REGARDING MATERIAL ASSISTANCE/NONASSISTANCE TO
A TERRORIST ORGANIZATION**

This form serves as a declaration of the provision of material assistance to a terrorist organization or organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List (see the Ohio Homeland Security Division website for a reference copy of the Terrorist Exclusion List).

Any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided. Failure to disclose the provision of material assistance to such an organization or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree.

For the purposes of this declaration, "material support or resources" means currency, payment instruments, other financial securities, funds, transfer of funds, and financial services that are in excess of one hundred dollars, as well as communications, lodging, training, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials.

LAST NAME		FIRST NAME		MIDDLE INITIAL
HOME ADDRESS				
CITY	STATE	ZIP	COUNTY	
HOME PHONE		WORK PHONE		

COMPLETE THIS SECTION ONLY IF YOU ARE A COMPANY, BUSINESS OR ORGANIZATION

BUSINESS/ORGANIZATION NAME
BUSINESS ADDRESS

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

CITY	STATE	ZIP	COUNTY
PHONE NUMBER			

DECLARATION

In accordance with division (A)(2)(b) of section 2909.32 of the Ohio Revised Code

For each question, indicate either "yes" or "no" in the space provided.
Responses must be truthful to the best of your knowledge.

1. Are you a member of an organization on the U.S. Department of State
Terrorist Exclusion
List?

☐ YES ☐ NO

2. Have you used any position of prominence you have with any country to
persuade others to support an organization on the U.S. Department of State
Terrorist Exclusion List?

☐ YES ☐ NO

3. Have you knowingly solicited funds or other things of value for an organization
on the U.S. Department of State Terrorist Exclusion List?

☐ YES ☐ NO

4. Have you solicited any individual for membership in an organization on the
U.S. Department of State Terrorist Exclusion List?

☐ YES ☐ NO

5. Have you committed an act that you know, or reasonably should have known,
affords "material support or resources" to an organization on the U.S.
Department of State Terrorist Exclusion List?

☐ YES ☐ NO

6. Have you hired or compensated a person you knew to be a member of an
organization on the U.S. Department of State Terrorist Exclusion List, or a
person you knew to be engaged in planning, assisting, or carrying out an act
of terrorism?

☐ YES ☐ NO

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

In the event of a denial of a government contract or government funding due to a positive indication that material assistance has been provided to a terrorist organization, or an organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List, a review of the denial may be requested. The request must be sent to the Ohio Department of Public Safety's Division of Homeland Security. The request forms and instructions for filing can be found on the Ohio Homeland Security Division website.

CERTIFICATION

I hereby certify that the answers I have made to all of the questions on this declaration are true to the best of my knowledge. I understand that if this declaration is not completed in its entirety, it will not be processed and I will be automatically disqualified. I understand that I am responsible for the correctness of this declaration. I understand that failure to disclose the provision of material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List, or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree. I understand that any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided by myself or my organization. If I am signing this on behalf of a company, business or organization, I hereby acknowledge that I have the authority to make this certification on behalf of the company, business or organization referenced on page 1 of this declaration.

X

Signature

Date

DOCUMENT 001000.17

Responsible Bidder Certification

Name of Bidder

Project: The Banks – Phase 3B, Public Infrastructure
Development, Lot 23/27 Garage and Race
Turnaround

Address of Bidder

Bid Reference No. _____

Date

("Bidder") hereby certifies to the Board of County Commissioners of Hamilton County, Ohio ("County") and the City of Cincinnati, Ohio ("City") that it will adhere to the Responsible Bidder Requirements (the "Responsible Bidder Requirements") set forth in the Bid Documents, and does hereby further certify to the County the following:

1. Bidder will require all contractors who bid or perform any work pursuant to the contract on which the Bidder is bidding to satisfy all of the Responsible Bidder Requirements set forth in the Project Manual.
2. Bidder will pay prevailing wages as determined by the Secretary of Labor in accordance with Federal-Aid Requirements.
3. Prior to award of a contract or subcontract of Two Hundred and Fifty Thousand Dollars (\$250,000) or more, the Bidder will engage in a review of the constructability and scope of the bid to verify that the contractor included all required work.
4. In the event Bidder submits the lowest bid and such bid is more than twenty percent (20%) below the bid of the next lowest bidder, the Bidder shall identify three (3) construction projects that it has successfully completed within five (5) years of the Bid date.
5. Bidder will employ supervisory personnel on the project that (a) are qualified to perform in such supervisory capacity and (b) have any license or licenses required by applicable law to perform in such capacity.

6. Bidder is not currently debarred from performing state or federal construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state or federal prevailing wage law. A list of every occasion on which Bidder has been debarred from performing local, state or federal construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state of federal prevailing wage law, during the last ten years, if any such debarments have occurred, are listed below:

7. Bidder, and each of its subcontractors have implemented an OSHA-compliant Safety Program which includes: a) with respect to all supervisors, completion of OSHA's thirty (30) hour safety course; and b) with respect to all field employees, completion of OSHA's ten (10) hour safety program. Bidder shall provide evidence of implementation of an OSHA-compliant safety program to the Construction Manager.
8. Bidder has implemented a substance-abuse policy that is in compliance with Ohio's Drug Free Workplace Requirements. Bidder will provide evidence of implementation of such policies to the Construction Manager.
9. Bidder has all licenses required by applicable state law and regulation to perform work required herein.
10. Any and all professional license or licenses that have been revoked by Ohio or revoked by any other state within five (5) years prior to the Bid date as listed below:

11. Bidder has no final judgments against it which are not secured by payment bond or other surety at the time of award which are equal to or exceed fifty percent (50%) of the Bidder's net worth.
12. Bidder has complied with applicable unemployment and workers compensation laws for at least two (2) years preceding the date of bid submittal.
13. Bidder will not subcontract more than seventy percent (70%) of the bid amount of the Contract. Bidder acknowledges it may apply for a waiver of the foregoing requirement by the County and the City, which waiver shall be subject to the review and approval of the County and the City.

14. Bidder does not have an Experience Modification Rating of more than 1.3 (a penalty rated employer) with respect to the Ohio Bureau of Workers' Compensation risk assessment rating.
15. Bidder is not debarred from bidding on the contracts that are the subject of this bid.
16. Bidder hereby acknowledges and agrees that bidder's falsification of any of the certifications herein or failure to comply with the requirements set forth herein, shall be the basis for a default termination of the Contract.

State of _____)
)ss.
County of _____)

BY: _____
ITS: _____

Sworn to and subscribed by _____ in my presence this _____ day of
_____ 202__.

NOTARY PUBLIC

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

DOCUMENT 001000.18

TAX EXEMPT STATEMENT

Purchases of building and construction materials and services by Contractor for incorporation into the Work or a portion of the Work that constitutes a structure or improvement to real property are not subject to Ohio sales or use tax pursuant to Ohio Revised Code 5739.02(B)(B)(13) and 5741.02(C)(2). Purchases by Contractor of expendable items or items consumed by Contractor in performance of the Work are not incorporated into a structure or improvement to real property and are not exempt from Ohio sales or use taxes as provided above. Examples of such purchases include, but are not limited to, form lumber, tools, oils, greases, fuel, equipment and trailer rental, temporary fencing and temporary road materials and temporary power equipment.

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

DOCUMENT 001000.21

CERTIFIED CHECK

If you are submitting a Certified Check: **Check #** _____ dollars

drawn on _____ **bank** is herewith submitted and deposited

in lieu of bond under the same terms and conditions as set forth in the bond.

PRINT NAME _____ of,

PRINT NAME OF COMPANY _____

Date

SIGNATURE

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

BID SUBMISSION DOCUMENT
COMPLETE & SUBMIT WITH BID

**DOCUMENT 001000.22
REGISTRATION FORM**

PLEASE READ AND ACKNOWLEDGE RECEIPT OF THIS DOCUMENT

The Banks–Phase 3B Public Infrastructure Development–Lot 23/27 Garage and Race Street Turnaround, Lot 23 Park, Lot 23/27 Garage Signage & Security, **Bid Package No. 6**

All inquiries regarding this ITB are to be in writing and are to be mailed or faxed to:

Gina Richmond, Hamilton County Purchasing Dept.
138 E. Court Street, Room 507
Cincinnati, Ohio 45202
Fax #: (513) 946-4335

The County will not entertain any oral questions regarding this ITB. Other than specified above, no bidder may contact any county official, employee, project team member or evaluation team member. Bidders are not to schedule appointments or have contact with any of the individuals connected to or having decision-making authority regarding the award of this ITB. **Inappropriate contact, including attempts to influence the ITB process, evaluation process or the award process by Bidders or by others on their behalf, will result in bid rejection.**

The only appropriate contact is with the Purchasing Department as listed above.

Have you been banned from doing business with the State of Ohio? _____.

Please fax this page to the Purchasing Department at (513) 946-4335.

By faxing this page to the Purchasing Department you will be registering your company's interest in this ITB, attendance at pre-bid conference and all ensuing addenda. Your signature is an acknowledgement that you have read and understand the information contained on this page.

DATE:	
COMPANY NAME:	
ADDRESS:	
REPRESENTATIVE'S NAME:	
TELEPHONE NUMBER:	
FACSIMILE NUMBER:	
EMAIL ADDRESS:	
NUMBER OF PEOPLE ATTENDING PREBID (where applicable)	
SIGNATURE:	

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

Registration helps insure that vendors will receive any addenda to or correspondence regarding this bid invitation in a timely manner. Neither Hamilton County nor the City of Cincinnati will not be responsible for the timeliness of delivery via the U.S. Mail.

DOCUMENT 001000.23
PREVAILING WAGE RATES

PART 1 GENERAL

1.1 SUMMARY

Bidders shall comply with the Prevailing Wage Rate set by the State for Federal Aid Project.

A. The current Prevailing Wage Rates data dated February 6,

PART 2 2020 are attached. PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

Appendix A

Prevailing Wage Rates

"General Decision Number: OH20200001 01/24/2020

Superseded General Decision Number: OH20190001

State: Ohio

Construction Types: Heavy and Highway

Counties: Ohio Statewide.

Heavy and Highway Construction Projects

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020
1	01/24/2020

BROH0001-001 06/01/2019

DEFIANCE, FULTON (Excluding Fulton, Amboy & Swan Creek Townships), HENRY (Excluding Monroe, Bartlow, Liberty, Washington, Richfield, Marion, Damascus & Townships & that part of Harrison Township outside corporate limits of city of Napoleon), PAULDING, PUTNAM and WILLIAMS COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11

BROH0001-004 06/01/2019

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER. . .	\$ 29.34	16.11

BROH0003-002 06/01/2019

Federal Rates HVY HWY 02062020

FULTON (Townships of Amboy, Swan Creek & Fulton), HENRY (Townships of Washington, Damascus, Richfield, Bartlow, Liberty, Harrison, Monroe, & Marion), LUCAS and WOOD (Townships of Perrysburg, Ross, Lake, Troy, Freedom, Montgomery, Webster, Center, Portage, Middleton, Plain, Liberty, Henry, Washington, Weston, Milton, Jackson & Grand Rapids) COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0005-003 05/01/2019

CUYAHOGA, LORAIN & MEDINA (Hickley, Granger, Brunswick, Liverpool, Montville, York, Homer, Harrisville, Chatham, Litchfield & Spencer Townships and the city of Medina)

	Rates	Fringes
BRI CKLAYER		
BRICKLAYERS; CAULKERS;		
CLEANERS; POINTERS; &		
STONEMASONS.....	\$ 34.85	16.94
SANDBLASTERS.....	\$ 35.10	16.94
SEWER BRICKLAYERS & STACK		
BUILDERS.....	\$ 35.35	16.94
SWING SCAFFOLDS.....	\$ 35.35	16.94

BROH0006-005 06/01/2019

CARROLL, COLUMBIANA (Knox, Butler, West & Hanover Townships), STARK & TUSCARAWAS

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0007-002 06/01/2019

LAWRENCE

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0007-005 06/01/2019

PORTAGE & SUMMIT

	Rates	Fringes
BRI CKLAYER.....	\$ 29.34	16.11

BROH0007-010 06/01/2019

PORTAGE & SUMMIT

	Rates	Fringes
MASON - STONE.....	\$ 29.34	16.11

Federal Rates HVY HWY 02062020

 BROH0008-001 06/01/2019

COLUMBIANA (Salem, Perry, Fairfield, Center, Elk Run,
 Middleton, & Unity Townships and the city of New Waterford),
 MAHONING & TRUMBULL

	Rates	Fringes
BRICKLAYER.	\$ 29.34	16.11

 BROH0009-002 06/01/2019

BELMONT & MONROE COUNTIES and the Townships of Warren & Mt.
 Pleasant and the Village of Dillonvale in JEFFERSON COUNTY

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11
Refractory.	\$ 31.45	19.01

 BROH0010-002 06/01/2019

COLUMBIANA (St. Clair, Madison, Wayne, Franklin, Washington,
 Yellow Creek & Liverpool Townships) & JEFFERSON (Brush Creek &
 Saline Townships)

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11

 BROH0014-002 06/01/2019

HARRISON & JEFFERSON (Except Mt. Pleasant, Warren, Brush Creek,
 Saline & Salineville Townships & the Village of Dillonvale)

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11

 BROH0016-002 06/01/2019

ASHTABULA, GEAUGA, and LAKE COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11

 BROH0018-002 06/01/2019

BROWN, BUTLER, CLERMONT, HAMILTON, PREBLE (Gasper, Dixon,
 Israel, Lanier, Somers & Gratis Townships) & WARREN COUNTIES:

	Rates	Fringes
Bricklayer, Stonemason.	\$ 29.34	16.11

 BROH0022-004 06/01/2019

Federal Rates HVY HWY 02062020

CHAMPAIGN, CLARK, CLINTON, DARKE, GREENE, HIGHLAND, LOGAN,
MIAMI, MONTGOMERY, PREBLE (Jackson, Monroe, Harrison, Twin,
Jefferson & Washington Townships) and SHELBY COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0032-001 06/01/2019		

GALLIA & MEIGS

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0035-002 06/01/2019		

ALLEN, AUGLAIZE, MERCER and VAN WERT COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0039-002 06/01/2019		

ADAMS & SCOTTO

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0040-003 06/01/2019		

ASHLAND, CRAWFORD, HARDIN, HOLMES, MARION, MORROW, RICHLAND,
WAYNE and WYANDOT (Except Crawford, Ridge, Richland & Tymochtee
Townships) COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

FOOTNOTE: Layout Man and Sawman rate: \$1.00 per hour above
journeyman rate.
Free standing stack work ground level to top of stack;
Sandblasting and laying of carbon masonry material in swing
stage and/or scaffold; Ramming and spading of plastics and
gunniting: \$1.50 per hour above journeyman rate.
""Hot"" work: \$2.50 above journeyman rate.

BROH0044-002 06/01/2019

	Rates	Fringes
Bricklayer, Stonemason COSHOCOTON, FAIRFIELD, GUERNSEY, HOCKING, KNOX, KICKING, MORGAN, MUSKINGUM, NOBLE (Beaver,		

Federal Rates HVY HWY 02062020

Buffalo, Seneca & Wayne
Townships) & PERRY

COUNTIES: \$ 29.34 16.11

BROH0045-002 06/01/2017

FAYETTE, JACKSON, PIKE, ROSS and VINTON COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 28.65	14.55

BROH0046-002 06/01/2019

ERIE, HANCOCK, HURON, OTTAWA, SANDUSKY, SENECA, WOOD (Perry & Bloom Townships) and WYANDOT (Tymochtee, Crawford, Ridge & Richland Townships) COUNTIES & the Islands of Lake Erie north of Sandusky

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

FOOTNOTE: Layout Man and Sawman rate: \$1.00 per hour above journeyman rate.
Free standing stack work ground level to top of stack;
Sandblasting and laying of carbon masonry material in swing stage and/or scaffold; Ramming and spading of plastics and gunniting: \$1.50 per hour above journeyman rate.
""Hot"" work: \$2.50 above journeyman rate.

BROH0052-001 06/01/2019

ATHENS COUNTY

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0052-003 06/01/2019

NOBLE (Brookfield, Noble, Center, Sharon, Olive, Enoch, Stock, Jackson, Jefferson & Elk Townships) and WASHINGTON COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 29.34	16.11

BROH0055-003 06/01/2017

DELAWARE, FRANKLIN, MADISON, PICKAWAY and UNION COUNTIES

	Rates	Fringes
Bricklayer, Stonemason.....	\$ 28.65	14.55

CARP0003-004 05/01/2017

MAHONING & TRUMBULL

Federal Rates HVY HWY 02062020
Rates Fri nges

CARPENTER. \$ 26.20 17.42

CARP0069-003 05/01/2017

CARROLL, STARK, TUSCARAWAS & WAYNE

Rates Fri nges

CARPENTER. \$ 25.98 15.98

CARP0069-006 05/01/2017

COSHOCTON, HOLMES, KNOX & MORROW

Rates Fri nges

CARPENTER. \$ 24.04 15.29

CARP0171-002 05/01/2019

BELMONT, COLUMBIANA, HARRISON, JEFFERSON & MONROE

Rates Fri nges

CARPENTER. \$ 27.37 20.02

CARP0200-002 05/01/2017

ADAMS, ATHENS, DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, GALLIA,
GUERNSEY, HIGHLAND, HOCKING, JACKSON, LAWRENCE, LICKING,
MADISON, MARION, MEIGS, MORGAN, MUSKINGUM, NOBLE, PERRY,
PICKAWAY, PIKE, ROSS, SCIOTO, UNION, VINTON and WASHINGTON
COUNTIES

Rates Fri nges

CARPENTER. \$ 29.07 16.22

Di ver. \$ 39.41 10.40

PI LEDRIVERMAN. \$ 29.07 16.22

CARP0248-005 07/01/2008

LUCAS & WOOD

Rates Fri nges

CARPENTER. \$ 27.27 14.58

CARP0248-008 07/01/2008

Rates Fri nges

CARPENTER

DEFIANCE, FULTON, HANCOCK,
HENRY, PAULDING & WILLIAMS
COUNTIES.

\$ 23.71 13.28

CARP0254-002 05/01/2017

ASHTABULA, CUYAHOGA, GEAUGA & LAKE

Federal Rates HVY HWY 02062020

	Rates	Fri nges
CARPENTER.	\$ 32.40	16.97

CARP0372-002 05/01/2016

ALLEN, AUGLAI ZE, HARDI N, MERCER, PUTNAM & VAN WERT

	Rates	Fri nges
CARPENTER.	\$ 24.54	18.21

CARP0639-003 05/01/2017

MEDI NA, PORTAGE & SUMMI T

	Rates	Fri nges
CARPENTER.	\$ 30.42	16.99

CARP0735-002 05/01/2019

ASHLAND, ERI E, HURON, LORAIN & RI CHLAND

	Rates	Fri nges
CARPENTER.	\$ 26.30	17.91

CARP1311-001 05/01/2017

BROWN, BUTLER, CHAMPAIGN, CLARK, CLERMONT, CLINTON, DARKE,
GREENE, HAMI LTON, LOGAN, MI AMI, MONTGOMERY, PREBLE, SHELBY &
WARREN

	Rates	Fri nges
Carpenter & Pi l edri vermen.	\$ 29.34	15.95
Di ver.	\$ 40.58	9.69

CARP1393-002 07/01/2008

CRAWFORD, DEFIANCE, FULTON, HANCOCK, HENRY, LUCAS, OTTAWA,
PAULDI NG, SANDUSKY, SENECA, WI LLI AMS & WOOD

	Rates	Fri nges
Pi l edri vermen & Di ver' s Tender. . .	\$ 27.30	16.05

DIVERS - \$250.00 per day

CARP1393-003 07/01/2008

ALLEN, AUGLAI ZE, HARDI N, MERCER, PUTNAM, VAN WERT & WYANDOT

	Rates	Fri nges
Pi l edri vermen & Di ver' s Tender. . .	\$ 25.15	15.92

DIVERS - \$250.00 per day

Federal Rates HVY HWY 02062020

CARP1871-006 05/01/2017

BELMONT, HARRISON, & MONROE

	Rates	Fringes
Diver, Wet.....	\$ 48.11	17.33
Piledrivermen; Diver, Dry.....	\$ 32.07	17.33

CARP1871-008 05/01/2017ASHLAND, ASHTABULA, CUYAHOGA, ERIE, GEAUGA, HURON, LAKE,
LORAIN, MEDINA, PORTAGE, RICHLAND & SUMMIT

	Rates	Fringes
Diver, Wet.....	\$ 45.80	18.84
Piledrivermen; Diver, Dry.....	\$ 30.53	18.84

CARP1871-014 05/01/2017

CARROLL, STARK, TUSCARAWAS & WAYNE

	Rates	Fringes
Diver, Wet.....	\$ 38.34	16.95
Piledrivermen; Diver, Dry.....	\$ 25.56	16.95

CARP1871-015 05/01/2017

COSHOCOTON, HOLMES, KNOX & MORROW

	Rates	Fringes
Diver, Wet.....	\$ 37.34	16.07
Piledrivermen; Diver, Dry.....	\$ 24.89	16.07

CARP1871-017 05/01/2017

MAHONING & TRUMBULL

	Rates	Fringes
Diver, Wet.....	\$ 40.65	17.62
Piledrivermen; Diver, Dry.....	\$ 27.10	17.62

CARP2235-012 01/01/2014

COLUMBIANA & JEFFERSON

	Rates	Fringes
PILEDRIVERMAN.....	\$ 31.74	16.41

CARP2239-001 07/01/2008

CRAWFORD, OTTAWA, SANDUSKY, SENECA & WYANDOT

	Rates	Fringes
CARPENTER.....	\$ 23.71	13.28

Federal Rates HVY HWY 02062020

ELEC0008-002 05/27/2019

DEFIANCE, FULTON, HANCOCK, HENRY, LUCAS, OTTAWA, PAULDING,
PUTNAM, SANDUSKY, SENECA, WILLIAMS & WOOD

	Rates	Fringes
CABLE SPLICER.....	\$ 38.98	18.96
ELECTRICIAN.....	\$ 40.45	1.5%+20.23

ELEC0032-003 12/02/2019ALLEN, AUGLAIZE, HARDIN, LOGAN, MERCER, SHELBY, VAN WERT &
WYANDOT (Crawford, Jackson, Marseilles, Mifflin, Ridgel and,
Ridge & Salem Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 31.37	19.24

ELEC0038-002 04/29/2019CUYAHOGA, GEAUGA (Bainbridge, Chester & Russell Townships) &
LORAIN (Columbia Township)

	Rates	Fringes
ELECTRICIAN Excluding Sound & Communications Work.....	\$ 39.13	20.69

FOOTNOTES;

- 6 Paid Holidays: New Year's Day; Memorial Day; July 4th;
Labor Day; Thanksgiving Day; & Christmas Day
- 1 week's paid vacation for 1 year's service; 2 weeks' paid
vacation for 2 or more years' service

ELEC0038-008 04/29/2019CUYAHOGA, GEAUGA (Bainbridge, Chester & Russell Townships) &
LORAIN (Columbia Township)

	Rates	Fringes
Sound & Communication Technician Communications Technician...	\$ 27.55	11.98
Installer Technician.....	\$ 26.30	11.94

FOOTNOTES;

- 6 Paid Holidays: New Year's Day; Memorial Day; July 4th;
Labor Day; Thanksgiving Day; & Christmas Day
- 1 week's paid vacation for 1 year's service; 2 weeks' paid
vacation for 2 or more years' service

ELEC0064-003 11/25/2019

Federal Rates HVY HWY 02062020
 COLUMBIANA (Butler, Fairfield, Perry, Salem & Unity Townships)
 MAHONING (Austintown, Beaver, Berlin, Boardman, Canfield,
 Ellsworth, Coitsville, Goshen, Green, Jackson, Poland,
 Springfield & Youngstown Townships), & TRUMBULL (Hubbard &
 Liberty Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 34.67	15.83

ELEC0071-001 01/01/2019		

ASHLAND, CHAMPAIGN, CLARK, COSHOCTON, CRAWFORD, DELAWARE,
 FAIRFIELD, FAYETTE, FRANKLIN, GUERNSEY, HIGHLAND, HOCKING,
 JACKSON (Coal, Jackson, Liberty, Milton, Washington & Wellston
 Townships), KNOX, LICKING, MADISON, MARION, MONROE, MORGAN,
 MORROW, MUSKINGUM, NOBLE, PERRY, PICKAWAY, PIKE (Beaver,
 Benton, Jackson, Mifflin, Pebble, Peepee, Perry & Seal
 Townships), RICHLAND, ROSS, TUSCARAWAS (Auburn, Bucks, Clay,
 Jefferson, Oxford, Perry, Salem, Rush, Washington & York
 Townships), UNION, VINTON (Clinton, Eagle, Elk, Harrison,
 Jackson, Richland & Swan Townships), and WASHINGTON COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operators.....	\$ 33.62	13.40
Groundmen.....	\$ 24.17	11.32
Linemen & Cable Splicers....	\$ 38.27	14.42

ELEC0071-004 01/01/2019		

AUGLAIZE, CLINTON, DARKE, GREENE, LOGAN, MERCER, MIAMI,
 MONTGOMERY, PREBLE, and SHELBY COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 33.62	13.40
Groundman.....	\$ 24.17	11.32
Lineman & Cable Splicers....	\$ 38.27	14.42

ELEC0071-005 12/31/2018		

ASHTABULA, CUYAHOGA, GEauga, LAKE & LORAIN

	Rates	Fringes
LINE CONSTRUCTION: Equipment Operator		
DOT/Traffic Signal & Highway Lighting Projects...	\$ 32.44	14.10
Municipal Power/Transit Projects.....	\$ 40.10	16.42
LINE CONSTRUCTION: Groundman		
DOT/Traffic Signal & Highway Lighting Projects...	\$ 25.06	12.26
Municipal Power/Transit Projects.....	\$ 31.19	14.11
LINE CONSTRUCTION:		

Federal Rates HVY HWY 02062020

Linemen/Cable Splicer		
DOT/Traffic Signal &		
Highway Lighting Projects...	\$ 36.13	15.03
Municipal Power/Transit		
Projects.....	\$ 44.56	17.58

ELEC0071-008 01/01/2019

COLUMBIANA, MAHONING, and TRUMBULL COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 33.62	13.40
Groundman.....	\$ 24.17	11.32
Lineman & Cable Splicers....	\$ 38.27	14.42

ELEC0071-010 01/01/2019

BELMONT, CARROLL, HARRISON, HOLMES, JEFFERSON, MEDINA, PORTAGE,
STARK, SUMMIT, and WAYNE COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 33.62	13.40
Groundman.....	\$ 24.17	11.32
Lineman & Cable Splicers....	\$ 38.27	14.42

ELEC0071-013 01/01/2019

BROWN, BUTLER, CLERMONT, HAMILTON, and WARREN COUNTIES

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 33.62	13.40
Groundman.....	\$ 24.17	11.32
Lineman & Cable Splicers....	\$ 38.27	14.42

ELEC0071-014 01/01/2019

ADAMS, ATHENS, GALLIA, JACKSON (Bloomfield, Franklin, Hamilton,
Lick, Jefferson, Scioto & Madison Townships), LAWRENCE, MEIGS,
PIKE (Camp Creek, Marion, Newton, Scioto, Sunfish & Union
Townships), SCIOTO & VINTON (Brown, Knox, Madison, Vinton &
Wilkesville Townships)

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 33.62	13.40
Groundman.....	\$ 24.17	11.32
Lineman & Cable Splicers....	\$ 38.27	14.42

* ELEC0082-002 12/02/2019

CLINTON, DARKE, GREENE, MIAMI, MONTGOMERY, PREBLE & WARREN
(Wayne, Clear Creek & Franklin Townships)

Federal Rates HVY HWY 02062020
Rates Fringes

ELECTRICIAN. \$ 31.15 19.96

ELEC0082-006 11/26/2018

CLINTON, DARKE, GREENE, MIAMI, MONTGOMERY, PREBLE & WARREN
(Wayne, Clear Creek & Franklin Townships)

Rates Fringes

Sound & Communication
Technician

Cable Puller. \$ 12.18 3.85
Installer/Technician. \$ 24.35 11.29

ELEC0129-003 03/25/2019

LORAIN (Except Columbia Township) & MEDINA (Litchfield &
Liverpool Townships)

Rates Fringes

ELECTRICIAN. \$ 34.35 17.30

ELEC0129-004 03/25/2019

ERIE & HURON (Lyme, Ridgefield, Norwalk, Townsend, Wakeman,
Sherman, Peru, Bronson, Hartland, Clarksfield, Norwich,
Greenfield, Fairfield, Fitchville & New London Townships)

Rates Fringes

ELECTRICIAN. \$ 34.35 17.30

ELEC0141-003 09/01/2019

BELMONT COUNTY

Rates Fringes

CABLE SPLICER. \$ 30.63 25.87
ELECTRICIAN. \$ 30.38 25.87

ELEC0212-003 11/26/2018

BROWN, CLERMONT & HAMILTON

Rates Fringes

Sound & Communication
Technician. \$ 24.35 10.99

ELEC0212-005 06/03/2019

BROWN, CLERMONT, and HAMILTON COUNTIES

Rates Fringes

ELECTRICIAN. \$ 30.18 18.89

Federal Rates HVY HWY 02062020

ELEC0245-001 08/26/2019

ALLEN, HARDIN, VAN WERT & WYANDOT (Crawford, Jackson,
Marseilles, Mifflin, Richland, Ridge & Salem Townships)

	Rates	Fringes
Line Construction		
Equipment Operator.....	\$ 32.37	25.9%+6.00
Groundman Truck Driver.....	\$ 17.70	25.9%+6.00
Linenman.....	\$ 40.46	25.9%+6.00

FOOTNOTE: a. Half day's Paid Holiday: The last 4 hours of
the workday prior to Christmas or New Year's Day

ELEC0245-003 08/26/2019

DEFIANCE, FULTON, HANCOCK, HENRY, HURON, LUCAS, OTTAWA,
PAULDING, PUTNAM, SANDUSKY, SENECA, WILLIAMS, and WOOD COUNTIES

	Rates	Fringes
Line Construction		
Cable Splicer.....	\$ 46.53	25.9%+6.00
Groundman/Truck Driver.....	\$ 17.70	25.9%+6.00
Helicopter Welding.....	\$ 40.76	25.9%+6.00
Linenman.....	\$ 40.46	25.9%+6.00
Operator - Class 1.....	\$ 32.37	25.9%+6.00
Operator - Class 2.....	\$ 28.32	25.9%+6.00
Traffic Signal & Lighting		
Technician.....	\$ 36.41	25.9%+6.00

FOOTNOTE: a. 6 Observed Holidays: New Year's Day; Memorial
Day; Independence Day; Labor Day; Thanksgiving Day; &
Christmas Day. Employees who work on a holiday shall be
paid at a rate of double their applicable classified
straight-time rates for the work performed on such holiday.

ELEC0245-004 08/26/2019

ERIE COUNTY

	Rates	Fringes
Line Construction		
Cable Splicer.....	\$ 46.53	25.9%+6.00
Groundman/Truck Driver.....	\$ 17.70	25.9%+6.00
Linenman.....	\$ 40.46	25.9%+6.00
Operator - Class 1.....	\$ 32.37	25.9%+6.00
Operator - Class 2.....	\$ 28.32	25.9%+6.00

FOOTNOTE: a. 6 Observed Holidays: New Year's Day; Memorial
Day; Independence Day; Labor Day; Thanksgiving Day; &
Christmas Day. Employees who work on a holiday shall be
paid at a rate of double their applicable classified
straight-time rates for the work performed on such holiday.

Federal Rates HVY HWY 02062020

ELEC0246-001 10/29/2018

	Rates	Fringes
ELECTRICIAN.....	\$ 38.00	84%+a

FOOTNOTE: a. 1 1/2 Paid Holidays: The last scheduled workday prior to Christmas & 4 hours on Good Friday.

ELEC0306-005 05/28/2018

MEDINA (Brunswick, Chatham, Granger, Guilford, Harri sville, Hinckley, Homer, Lafayette, Medina, Montville, Sharon, Spencer, Wadsworth, Westfield & York Townships), PORTAGE (Atwater, Aurora, Brimfield, Deerfield, Franklin, Mantua, Randolph, Ravenna, Rootstown, Shalersville, Streetsboro & Suffield Townships), SUMMIT & WAYNE (Baughman, Canaan, Chester, Chippewa, Congress, Green, Milton, & Wayne Townships)

	Rates	Fringes
CABLE SPLICER.....	\$ 36.87	16.56
ELECTRICIAN.....	\$ 34.54	5%+18.06

ELEC0317-002 06/01/2019

GALLIA & LAWRENCE

	Rates	Fringes
CABLE SPLICER.....	\$ 32.68	18.13
ELECTRICIAN.....	\$ 34.35	25.70

ELEC0540-005 01/01/2019

CARROLL (Northern half, including Fox, Harrison, Rose & Washington Townships), COLUMBIANA (Knox Township), HOLMES, MAHONING (Smith Township), STARK, TUSCARAWAS (North of Auburn, Clay, Rush & York Townships), and WAYNE (South of Baughman, Chester, Green & Wayne Townships) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 32.55	23.58

ELEC0573-003 11/25/2019

ASHTABULA (Colebrook, Wayne, Williamsfield, Orwell & Windsor Townships), GEAUGA (Auburn, Middlefield, Parkman & Troy Townships), MAHONING (Milton Township), PORTAGE (Charlestown, Edinburg, Freedom, Hiram, Nelson, Palmyra, Paris & Windham Townships), and TRUMBULL (Except Liberty & Hubbard Townships)

	Rates	Fringes
ELECTRICIAN.....	\$ 34.21	19.24

ELEC0575-001 05/27/2019

Federal Rates HVY HWY 02062020

ADAMS, FAYETTE, HIGHLAND, HOCKING, JACKSON (Bl oomfi el d, Franklin, Hami lton, Jefferson, Lick, Madi son, Sci oto, Coal, Jackson, Li berty, Mil ton & Washi ngton Townshi ps), PI CKAWAY (Deer Creek, Perry, Pi ckaway, Sal t Creek & Wayne Townshi ps), PI KE (Beaver, Benton, Jackson, Mi fflin, Pebble, PeePee, Perry, Seal, Camp Creek, Newton, Sci oto, Sunfi sh, Uni on & Mari on Townshi ps), ROSS, SCIOTO & VINTON (Clinton, Eagle, Elk, Harri son, Jackson, Ri chl and & Swan Townshi ps)

	Rates	Fri nges
ELECTRI CI AN.	\$ 33. 75	17. 19

ELEC0648-001 09/02/2019

BUTLER and WARREN COUNTIES (Deerfi el d, Hami lton, Harlan, Massie, Sal em, Turtl e Creek, Uni on & Washi ngton Townshi ps)

	Rates	Fri nges
CABLE SPLI CER.	\$ 30. 50	18. 23
ELECTRI CI AN.	\$ 30. 00	19. 85

ELEC0673-004 05/27/2019

ASHTABULA (Excl udi ng Orwel l, Col ebrook, Wi l l iamsfi el d, Wayne & Windsor Townshi ps), GEAUGA (Burton, Chardon, Clari don, Hambden, Huntsburg, Montvi l l e, Munson, Newbury & Thompson Townshi ps) and LAKE COUNTIES

	Rates	Fri nges
CABLE SPLI CER.	\$ 33. 31	21. 46
ELECTRI CI AN.	\$ 33. 03	21. 45

ELEC0683-002 05/27/2019

CHAMPAIGN, CLARK, DELAWARE, FAIRFIELD, FRANKLIN, MADI SON, PI CKAWAY (Ci rcl evi l l e, Darby, Harri son, Jackson, Madi son, Monroe, Muhl enberg, Sci oto, Wal nut & Washi ngton Townshi ps), and UNI ON COUNTIES

	Rates	Fri nges
CABLE SPLI CER.	\$ 34. 50	21. 20
ELECTRI CI AN.	\$ 33. 50	20. 18

* ELEC0688-003 12/02/2019

ASHLAND, CRAWFORD, HURON (Ri chmond, New Haven, Ri pl ey & Greenwich Townshi ps), KNOX (Li berty, Clinton, Uni on, Howard, Monroe, Mi ddl eberry, Morris, Wayne, Berlin, Pi ke, Brown & Jefferson Townshi ps), MARI ON, MORROW, RI CHLAND and WYANDOT (Sycamore, Crane, Eden, Pi tt, Antrim & Tymochtee Townshi ps) COUNTIES

Rates	Fri nges
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Federal Rates HVY HWY 02062020

ELECTRICIAN.....\$ 30.00 18.86

ELEC0972-002 06/01/2019

ATHENS, MEIGS, MONROE, MORGAN, NOBLE, VINTON (Brown, Knox, Madison, Vinton & Wilkesville Townships), and WASHINGTON COUNTIES

	Rates	Fringes
CABLE SPLICER.....	\$ 33.80	26.65
ELECTRICIAN.....	\$ 33.55	26.65

ELEC1105-001 05/28/2018

COSHOCTON, GUERNSEY, KNOX (Jackson, Clay, Morgan, Miller, Milford, Hilliar, Butler, Harrison, Pleasant & College Townships), LICKING, MUSKINGUM, PERRY, and TUSCARAWAS (Auburn, York, Clay, Jefferson, Rush, Oxford, Washington, Salem, Perry & Bucks Townships) COUNTIES

	Rates	Fringes
ELECTRICIAN.....	\$ 30.95	17.96

ENGI0018-003 05/01/2019

ASHTABULA, CUYAHOGA, ERIE, GEauga, LAKE, LORAIN, MEDINA, PORTAGE, and SUMMIT COUNTIES

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 38.63	15.20
GROUP 2.....	\$ 38.53	15.20
GROUP 3.....	\$ 37.49	15.20
GROUP 4.....	\$ 36.27	15.20
GROUP 5.....	\$ 30.98	15.20
GROUP 6.....	\$ 38.88	15.20
GROUP 7.....	\$ 39.13	15.20

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail

Federal Rates HVY HWY 02062020

Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; Wheel Excavator; and Asphalt Plant Engineer (Cleveland District Only).

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring Machine More than 48"; Bulldozer; Endloader; Horizontal Directional Drill (Over 50,000 ft lbs thrust); Hydro Milling Machine; Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all); Grinders & Planers of All types; Trench Machine (24" wide & under); Vermeer type Concrete Saw; and Maintenance Operators (Portage and Summit Counties Only).

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low pressure); Asphalt Plant Engineer (Portage and Summit Counties Only); Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4" & over discharge); Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (small equipment); Welding Machines; and Railroad Tie Insert/Remover; Articulating/straight bed end dumps if assigned (minus \$4.00 per hour).

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway); Finishing Machine; Fireperson, Floating Equipment (all types); Forklift; Form Trencher; Hydro Hammer expert masonry; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); and Vibratory Compactor with Integral Power.

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt Plant); Generator; Masonry Fork Lift; Inboard-Outboard Motor Boat Launch; Oil Heater (asphalt plant); Oiler/Helper; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4" discharge); Signal person; Tire Repairperson; VAC/ALLS; Cranes - Compact, track or rubber under 4,000 pound capacity; fueling and greasing; and Chainmen.

Federal Rates HVY HWY 02062020

GROUP 6 - Master Mechanic & Boom from 150 to 180.

GROUP 7 - Boom from 180 and over.

ENGI 0018-004 05/01/2019

ADAMS, ALLEN, ASHLAND, ATHENS, AUGLAIZE, BELMONT, BROWN,
BUTLER, CARROLL, CHAMPAIGN, CLARK, CLERMONT, CLINTON,
COSHOCKTON, CRAWFORD, DARKE, DEFIANCE, DELAWARE, FAIRFIELD,
FAYETTE, FRANKLIN, FULTON, GALLIA, GREENE, GUERNSEY, HAMILTON,
HANCOCK, HARDIN, HARRISON, HENRY, HIGHLAND, HOCKING, HOLMES,
HURON, JACKSON, JEFFERSON, KNOX, LAWRENCE, LICKING, LOGAN,
LUCAS, MADISON, MARI ON, MEIGS, MERCER, MIAMI, MONROE,
MONTGOMERY, MORGAN, MORROW, MUSKINGUM, NOBLE, OTTAWA, PAULDING,
PERRY, PICKAWAY, PIKE, PREBLE, PUTNAM, RICHLAND, ROSS,
SANDUSKY, SCIOTO, SENECA, SHELBY, STARK, TUSCARAWAS, UNION, VAN
WERT, VINTON, WARREN, WASHINGTON, WAYNE, WILLIAMS, WOOD, and
YANDOT COUNTIES

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 37.14	15.20
GROUP 2.....	\$ 37.02	15.20
GROUP 3.....	\$ 35.98	15.20
GROUP 4.....	\$ 34.80	15.20
GROUP 5.....	\$ 29.34	15.20
GROUP 6.....	\$ 37.39	15.20
GROUP 7.....	\$ 37.64	15.20

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Air Compressor on Steel Erection; Barrier Moving Machine; Boiler Operator on Compressor or Generator when mounted on a Rig; Cableway; Combination Concrete Mixer & Tower; Concrete Plant (over 4 yd. Capacity); Concrete Pump; Crane (All Types, Including Boom Truck, Cherry Picker); Crane-Compact, Track or Rubber over 4,000 lbs. capacity; Cranes-Self Erecting, Stationary, Track or Truck (All Configurations); Derrick; Dragline; Dredge (Dipper, Clam or Suction); Elevating Grader or Euclid Loader; Floating Equipment (All Types); Gradall; Helicopter Crew (Operator-Hoist or Winch); Hoe (all types); Hoisting Engine on Shaft or Tunnel Work; Hydraulic Gantry (Lifting System); Industrial-Type Tractor; Jet Engine Dryer (D8 or D9) Diesel Tractor; Locomotive (Standard Gauge); Maintenance Operator Class A; Mixer, Paving (Single or Double Drum); Mucking Machine; Multiple Scraper; Piledriving Machine (All Types); Power Shovel; Prentice Loader; Quad 9 (Double Pusher); Rail Tamper (with auto lifting & aligning device); Refrigerating Machine (Freezer Operation); Rotary Drill, on Caisson work; Rough Terrain Fork Lift with Winch/Hoist; Side-Boom; Slip-Form Paver; Tower Derrick; Tree Shredder; Trench Machine (Over 24" wide); Truck Mounted Concrete Pump; Tug Boat; Tunnel Machine and/or Mining Machine; and Wheel Excavator.

GROUP 2 - Asphalt Paver; Automatic Subgrader Machine, Self-Propelled (CMI Type); Bobcat Type and/or Skid Steer Loader with Hoe Attachment Greater than 7,000 lbs.; Boring

Federal Rates HVY HWY 02062020

Machine More than 48""; Bulldozer; Endloader; Hydro Milling Machine; Horizontal Directional Drill (over 50,000 ft. lbs. thrust); Kolman-type Loader (production type-Dirt); Lead Greaseman; Lighting & Traffic Signal Installation Equipment (includes all groups or classifications); Material Transfer Equipment (Shuttle Buggy) Asphalt; Pettibone-Rail Equipment; Power Grader; Power Scraper; Push Cat; Rotomill (all), Grinders & Planers of All types; Trench Machine (24"" wide & under); and Vermeer type Concrete Saw.

GROUP 3 - A-Frame; Air Compressor on Tunnel Work (low pressure); Asphalt Plant Engineer; Bobcat-type and/or Skid Steer Loader with or without Attachments; Highway Drills (all types); Locomotive (narrow gauge); Material Hoist/Elevator; Mixer, Concrete (more than one bag capacity); Mixer, one bag capacity (Side Loader); Power Boiler (Over 15 lbs. Pressure) Pump Operator installing & operating Well Points; Pump (4"" & over discharge); Railroad Tie Insert/Remover; Roller, Asphalt; Rotovator (lime soil stabilizer); Switch & Tie Tampers (without lifting & aligning device); Utility Operator (Small equipment); and Welding Machines; Articulating/straight bed end dumps if assigned (minus \$4.00 per hour).

GROUP 4 - Backfiller; Ballast Re-locator; Bars, Joint & Mesh Installing Machine; Batch Plant; Boring Machine Operator (48"" or less); Bull Floats; Burlap & Curing Machine; Concrete Plant (capacity 4 yd. & under); Concrete Saw (Multiple); Conveyor (Highway); Crusher; Deckhand; Farm-type Tractor with attachments (highway); Finishing Machine; Fireperson, Floating Equipment (all types); Fork Lift; Form Trencher; Hydro Hammer expert masonry; Hydro Seeder; Pavement Breaker; Plant Mixer; Post Driver; Post Hole Digger (Power Auger); Power Brush Burner; Power Form Handling Equipment; Road Widening Trencher; Roller (Brick, Grade & Macadam); Self-Propelled Power Spreader; Self-Propelled Power Subgrader; Steam Fireperson; Tractor (Pulling Sheepfoot, Roller or Grader); and Vibratory Compactor with Integral Power.

GROUP 5 - Compressor (Portable, Sewer, Heavy & Highway); Drum Fireperson (Asphalt Plant); Generator; Masonary Forklift; Inboard-Outboard Motor Boat Launch; Oil Heater (asphalt plant); Oiler/Helper; Power Driven Heater; Power Sweeper & Scrubber; Pump (under 4"" discharge); Signal person; Tire Repairperson; VAC/ALLS; Cranes - Compact, track or rubber under 4,000 pound capacity; fueling and greasing; and Chai nmen.

GROUP 6 - Master Mechanic & Boom from 150 to 180.

GROUP 7 - Boom from 180 and over.

ENGI 0066-023 06/01/2017

COLUMBIANA, MAHONING & TRUMBULL COUNTIES

Rates

Fringes

POWER EQUIPMENT OPERATOR
ASBESTOS; HAZARDOUS/TOXIC
WASTE PROJECTS

Federal Rates HVY HWY 02062020

GROUP 1 - A & B.....	\$ 39.23	19.66
ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 2 - A & B.....	\$ 38.90	19.66
ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 3 - A & B.....	\$ 34.64	19.66
ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 4 - A & B.....	\$ 30.70	19.66
ASBESTOS; HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 5 - A & B.....	\$ 27.30	19.66
HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 1 - C & D.....	\$ 35.96	19.66
HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 2 - C & D.....	\$ 35.66	19.66
HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 3 - C & D.....	\$ 31.76	19.66
HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 4 - C & D.....	\$ 28.14	19.66
HAZARDOUS/TOXIC WASTE PROJECTS		
GROUP 5 - C & D.....	\$ 25.03	19.66
ALL OTHER WORK		
GROUP 1.....	\$ 32.69	19.66
ALL OTHER WORK		
GROUP 2.....	\$ 32.42	19.66
ALL OTHER WORK		
GROUP 3.....	\$ 28.87	19.66
ALL OTHER WORK		
GROUP 4.....	\$ 25.58	19.66
ALL OTHER WORK		
GROUP 5.....	\$ 22.75	19.66
GROUP 1 - Rig, Pile Driver or Caisson Type; & Rig, Pile Hydraulic Unit Attached		
GROUP 2 - Asphalt Heater Planer; Backfiller with Drag Attachment; Backhoe; Backhoe with Shear attached; Backhoe-Rear Pivotal Swing; Batch Plant-Central Mix Concrete; Batch Plant, Portable concrete; Berm Builder-Automatic; Boat Derrick; Boat-Tug; Boring Machine Attached to Tractor; Bulldozer; Bulldozer;		

Federal Rates HVY HWY 02062020

C.M.I. Road Builder & Similar Type; Cable Placer & Layer; Carrier-Straddle; Carryall-Scraper or Scoop; Chicago Boom; Compactor with Blade Attached; Concrete Saw (Vermeer or similar type); Concrete Spreader Finisher; Combination, Bidwell Machine; Crane; Crane-Electric Overhead; Crane-Rough Terrain; Crane-Side Boom; Crane-Truck; Crane-Tower; Derrick-Boom; Derrick-Car; Digger-Wheel (Not trencher or road widener); Double Nine; Drag Line; Dredge; Drill-Kenny or Similar Type; Easy Pour Median Barrier Machine (or similar type); Electromatic; Frankie Pile; Gradall; Grader; Gurry; Self-Propelled; Heavy Equipment Robotics Operator/Mechanic; Hoist-Monorail; Hoist-Stationary & Mobile Tractor; Hoist, 2 or 3 drum; Horizontal Directional Drill Operator; Jackall; Jumbo Machine; Kocal & Kuhlman; Land-Seagoing Vehicle; Loader, Elevating; Loader, Front End; Loader, Skid Steer; Locomotive; Mechanic/Welder; Metro Chip Harvester with Boom; Mucking Machine; Paver-Asphalt Finishing Machine; Paver-Road Concrete; Paver-Slip Form (C.M.I. or similar); Place Crete Machine with Boom; Post Driver (Carrier mounted); Power Driven Hydraulic Pump & Jack (When used in Slip Form or Lift Slab Construction); Pump Crete Machine; Regulator-Ballast; Hydraulic Power Unit not attached to Rig for Pile Drillings; Rigs-Drilling; Roto Mill or similar Full Lane (8' Wide & Over); Roto Mill or similar type (Under 8'); Shovel; Slip Form Curb Machine; Speedwing; Spikemaster; Stonecrusher; Tie Puller & Loader; Tie Tamper; Tractor-Double Boom; Tractor with Attachments; Truck-Boom; Truck-Tire; Trench Machine; Tunnel Machine (Mark 21 Java or similar); & Whirley (or similar type)

GROUP 3 - Asphalt Plant; Bending Machine (Pipeline or similar type); Boring machine, Motor Driven; Chip Harvester without Boom; Cleaning Machine, Pipeline Type; Coating Machine, Pipeline Type; Compactor; Concrete Belt Placer; Concrete Finisher; Concrete Planer or Asphalt; Concrete Spreader; Elevator; Fork Lift (Home building only); Fork Lift & Lulls; Fork Lift Walk Behind (Hoisting over 1 buck high); Form Line Machine; Grease Truck operator; Grout Pump; Gunnite Machine; Horizontal Directional Drill Locator; Single Drum Hoist with or without Tower; Huck Bolting Machine; Hydraulic Scaffold (Hoisting building materials); Paving Breaker (Self-propelled or Ridden); Pipe Dream; Pot Fireperson (Power Agitated); Refrigeration Plant; Road Widener; Roller; Sasgen Derrick; Seeding Machine; Soil Stabilizer (Pump type); Spray Cure Machine, Self-Propelled; Straw Blower Machine; Sub-Grader; Tube Finisher or Broom C.M.I. or similar type; & Tugger Hoist

GROUP 4 - Air Curtain Destructor & Similar Type; Batch Plant-Job Related; Boiler Operator; Compressor; Conveyor; Curb Builder, self-propelled; Drill Wagon; Generator Set; Generator-Steam; Heater-Portable Power; Hydraulic Manipulator Crane; Jack-Hydraulic Power driven; Jack-Hydraulic (Railroad); Ladavator; Minor Machine Operator; Mixer-Concrete; Mulching Machine; Pin Puller; Power Broom; Pulverizer; Pump; Road Finishing Machine (Pul Type); Saw-Concrete-Self-Propelled (Highway Work); Signal Person; Spray Cure Machine-Motor Powered; Stump Cutter; Tractor; Trencher Form; Water Blaster; Steam Jenny; Syphon; Vibrator-Gasoline; & Welding Machine

GROUP 5 - Brakeperson; Fireperson; & Oilier

Federal Rates HVY HWY 02062020

IRON0017-002 05/01/2019

ASHTABULA (North of Route 6, starting at the Geauga County Line, proceeding east to State Route 45), CUYAHOGA, ERIE (Eastern 2/3), GEAUGA, HURON (East of a line drawn from the north border through Monroeville & Willard), LAKE, LORAIN, MEDINA (North of Old Rte. #224), PORTAGE (West of a line from Middlefield to Shalersville to Deerfield), and SUMMIT (North of Old Rte. #224, including city limits of Barberton) COUNTIES

	Rates	Fringes
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IRONWORKER

Ornamental, Reinforcing, & Structural	\$ 34.93	22.00
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IRON0017-010 05/01/2019

ASHTABULA (Eastern part from Lake Erie on the north to route #322 on the south to include Conneaut, Kingsville, Sheffield, Denmark, Dorset, Cherry Valley, Wayne, Monroe, Pierpont, Richmond, Andover & Williamsfield Townships)

	Rates	Fringes
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IRONWORKER

Structural, including metal building erection & Reinforcing	\$ 34.93	22.00
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IRON0044-001 06/01/2018

ADAMS (Western Part), BROWN, BUTLER (Southern Part), CLERMONT, CLINTON (South of a line drawn from Blanchester to Lynchburg), HAMILTON, HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) and WARREN (South of a line drawn from Blanchester through Morrow to the west county line) COUNTIES

	Rates	Fringes
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IRONWORKER, REINFORCING

Beyond 30-mile radius of Hamilton County Courthouse..	\$ 28.67	21.20
Up to & including 30-mile radius of Hamilton County Courthouse.....	\$ 27.60	20.70

IRON0044-002 06/01/2019

CLINTON (South of a line drawn from Blanchester to Lynchburg), HAMILTON, HIGHLAND (Excluding eastern one-fifth & portion of county inside lines drawn from Marshall to Lynchburg from the northern county line through E. Monroe to Marshall) & WARREN (South of a line drawn from Blanchester through Morrow to the west county line)

Federal Rates HVY HWY 02062020

	Rates	Fri nges
IRONWORKER		
Fence Erector.....	\$ 28.00	21.20
Ornamental; Structural.....	\$ 29.47	21.20

IRON0055-003 07/01/2019

CRAWFORD (Area Between lines drawn from where Hwy #598 & #30 meet through N. Liberty to the northern border & from said Hwy junction point due west to the border), DEFIANCE (S. of a line drawn from where Rte. #66 meets the northern line through Independence to the eastern county border), ERIE (Western 1/3), FULTON, HANCOCK, HARDIN (North of a line drawn from Maysville to a point 4 miles south of the northern line on the eastern line), HENRY, HURON (West of a line drawn from the northern border through Monroeville & Willard), LUCAS, OTTAWA, PUTNAM (East of a line drawn from the northern border down through Miller City to where #696 meets the southern border), SANDUSKY, SENECA, WILLIAMS (East of a line drawn from Pioneer through Stryker to the southern border), WOOD & WYANDOT (North of Rte. #30)

	Rates	Fri nges
IRONWORKER		
Fence Erector.....	\$ 21.30	20.92
Flat Road Mesh.....	\$ 29.77	21.30
Tunnels & Caissons Under Pressure.....	\$ 29.77	21.30
All Other Work.....	\$ 30.38	24.40

IRON0147-002 06/01/2015

ALLEN (Northern half), DEFIANCE (Northern part, excluding south of a line drawn from where Rte. #66 meets the northern line through Independence to the eastern county border), MERCER (Northern half), PAULDING, PUTNAM (Western part, excluding east of a line drawn from the northern border down through Miller City to where #696 meets the southern border), VAN WERT, and WILLIAMS (Western part, excluding east of a line drawn from Pioneer through Stryker to the southern border) COUNTIES

	Rates	Fri nges
IRONWORKER.....	\$ 25.39	20.64

IRON0172-002 06/01/2019

CHAMPAIGN (Eastern one-third), CLARK (Eastern one-fourth), COSHOCTON (West of a line beginning at the northwestern county line going through Walhonding & Tunnel Hill to the southern county line), CRAWFORD (South of Rte. #30), DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, HARDIN (Excluding a line drawn from Roundhead to Maysville), HIGHLAND (Eastern one-fifth), HOCKING, JACKSON (Northern half), KNOX, LICKING, LOGAN (Eastern one-third), MADISON, MARION, MORROW, MUSKINGUM (West of a line starting at Adams Mill going to Adamsville & going from Adamsville through Blue Rock to the southern border), PERRY, PICKAWAY, PIKE (Northern half), ROSS, UNION, VINTON and WYANDOT

(South of Rte. #30) COUNTIES

	Rates	Fri nges
IRONWORKER.....	\$ 30.00	20.70

IRON0207-004 06/01/2019

ASHTABULA (Southern part starting at the Geauga County line),
COLUMBIANA (E. of a line from Damascus to Highlandtown),
MAHONING (N. of Old Route #224), PORTAGE (E. of a line from
Middlefield to Shalersville to Deerfield) & TRUMBULL

	Rates	Fri nges
IRONWORKER		
Layout; Sheeter.....	\$ 30.72	25.15
Ornamental; Reinforcing;		
Structural.....	\$ 28.06	24.70
Ornamental; Reinforcing.....	\$ 29.72	25.18

IRON0290-002 06/01/2019

ALLEN (Southern half), AUGLAIZE, BUTLER (North of a line drawn
from east to the west county line going through Oxford,
Darrtown & Woodsdale), CHAMPAIGN (Excluding east of a line
drawn from Catawba to the point where #68 intersects the
northern county line), CLARK (Western two-thirds), CLINTON
(Excluding south of a line drawn from Blanchester to
Lynchburg), DARKE, GREENE, HIGHLAND (Inside lines drawn from
Marshall to Lynchburg & from the northern county line through
East Monroe to Marshall), LOGAN (West of a line drawn from
West Liberty to where the northern county line meets the
western county line of Hardin), MERCER (Southern half), MIAMI,
MONTGOMERY, PREBLE, SHELBY & WARREN (Excluding south of a line
drawn from Blanchester through Morrow to the western county
line) COUNTIES

	Rates	Fri nges
IRONWORKER.....	\$ 29.23	33.35

IRON0549-003 12/01/2018

BELMONT, GUERNSEY, HARRISON, JEFFERSON, MONROE & MUSKINGUM
(Excluding portion west of a line starting at Adams Mill going
to Adamsville and going from Adamsville through Blue Rock to
the south border)

	Rates	Fri nges
IRONWORKER.....	\$ 33.34	20.81

IRON0550-004 05/01/2019

ASHLAND, CARROLL, COLUMBIANA (W. of a line from Damascus to
Highlandtown), COSHOCTON (E. of a line beginning at NW Co. line
going through Walhonding & Tunnel Hill to the South Co. line),
HOLMES, HURON (S. of Old Rte. #224), MAHONING (S. of Old Rte.

Federal Rates HVY HWY 02062020
 #224), MEDINA (S. of Old Rte. #224), PORTAGE (S. of Old Rte.
 #224), RICHLAND, STARK, SUMMIT (S. of Old Rte. #224, Excluding
 city limits of Barberton), TUSCARAWAS, & WAYNE

	Rates	Fringes
Ironworkers: Structural, Ornamental and Reinforcing.....	\$ 28.90	19.87

IRON0769-004 06/01/2019		

ADAMS (Eastern Half), GALLIA, JACKSON (Southern Half), LAWRENCE
 & SCIOTO

	Rates	Fringes
IRONWORKER.....	\$ 32.00	25.95

IRON0787-003 12/01/2019		

ATHENS, MEIGS, MORGAN, NOBLE, and WASHINGTON COUNTIES

	Rates	Fringes
IRONWORKER.....	\$ 30.18	22.75

LAB00265-008 05/01/2018		

	Rates	Fringes
LABORER		
ASHTABULA, ERIE, HURON, LORAIN, LUCAS, MAHONING, MEDINA, OTTAWA, PORTAGE, SANDUSKY, STARK, SUMMIT, TRUMBULL & WOOD COUNTIES		
GROUP 1.....	\$ 31.05	10.95
GROUP 2.....	\$ 31.22	10.95
GROUP 3.....	\$ 31.55	10.95
GROUP 4.....	\$ 32.00	10.95
CUYAHOGA AND GEAUGA COUNTIES ONLY: SEWAGE PLANTS, WASTE PLANTS, WATER TREATMENT FACILITIES, PUMPING STATIONS, & ETHANOL PLANTS CONSTRUCTION.....		
	\$ 33.66	10.95
CUYAHOGA, GEAUGA & LAKE COUNTIES		
GROUP 1.....	\$ 32.28	10.95
GROUP 2.....	\$ 32.45	10.95
GROUP 3.....	\$ 32.78	10.95
GROUP 4.....	\$ 33.23	10.95
REMAINING COUNTIES OF OHIO		
GROUP 1.....	\$ 30.62	10.95
GROUP 2.....	\$ 30.79	10.95
GROUP 3.....	\$ 31.12	10.95
GROUP 4.....	\$ 31.57	10.95

LABORER CLASSIFICATIONS

Federal Rates HVY HWY 02062020

GROUP 1 - Asphalt Laborer; Carpenter Tender; Concrete Curing Applicator; Dump Man (Batch Truck); Guardrail and Fence Installer; Joint Setter; Laborer (Construction); Landscape Laborer; Mesh Handlers & Placer; Right-of-way Laborer; Riprap Laborer & Grouter; Scaffold Erector; Seal Coating; Surface Treatment or Road Mix Laborer; Sign Installer; Slurry Seal; Utility Man; Bridge Man; Handyman; Waterproofing Laborer; Flagperson; Hazardous Waste (Level D); Diver Tender; Zone Person & Traffic Control

GROUP 2 - Asphalt Raker; Concrete Puddler; Kettle Man (Pipeline); Machine Driven Tools (Gas, Electric, Air); Mason Tender; Brick Paver; Mortar Mixer; Power Buggy or Power Wheelbarrow; Paint Stripper; Sheeting & Shoring Man; Surface Grinder Man; Plastic Fusing Machine Operator; Pug Mill Operator; & Vacuum Devices (wet or dry); Rodding Machine Operator; Diver; Screwman or Paver; Screed Person; Water Blast, Hand Held Wand; Pumps 4" & Under (Gas, Air or Electric) & Hazardous Waste (Level C); Air Track and Wagon Drill; Bottom Person; Cofferdam (below 25 ft. deep); Concrete Saw Person; Cutting with Burning Torch; Form Setter; Hand Spiker (Railroad); Pipelayer; Tunnel Laborer (without air) & Caisson; Underground Person (working in Sewer and Waterline, Cleaning, Repairing & Reconditioning); Sandblaster Nozzle Person; & Hazardous Waste (Level B)

GROUP 3 - Blaster; Mucker; Powder Person; Top Lander; Wrencher (Mechanical Joints & Utility Pipeline); Yarnier; Hazardous Waste (Level A); Concrete Specialist; Concrete Crew in Tunnels (With Air-pressurized - \$1.00 premium); Curb Setter & Cutter; Grade Checker; Utility Pipeline Tapper; Waterline; and Caulker

GROUP 4 - Miner (With Air-pressurized - \$1.00 premium); & Guniting Nozzle Person

TUNNEL LABORER WITH AIR-PRESSURIZED ADD \$1.00 TO BASE RATE

SIGNAL PERSON WILL RECEIVE THE RATE EQUAL TO THE RATE PAID THE LABORER CLASSIFICATION FOR WHICH HE OR SHE IS SIGNALING.

PAI N0006-002 05/01/2018

ASHTABULA, CUYAHOGA, GEauga, LAKE, LORAIN, PORTAGE (N. of the East-West Turnpike) & SUMMIT (N. of the East-West Turnpike)

	Rates	Fringes
PAINTER		
COMMERCIAL NEW WORK; REMODELING; & RENOVATIONS		
GROUP 1.....	\$ 27.90	16.16
GROUP 2.....	\$ 28.30	16.16
GROUP 3.....	\$ 28.60	16.16
GROUP 4.....	\$ 34.16	16.16
COMMERCIAL REPAINT		
GROUP 1.....	\$ 26.40	16.16
GROUP 2.....	\$ 26.80	16.16
GROUP 3.....	\$ 27.10	16.16

PAINTER CLASSIFICATIONS - COMMERCIAL NEW WORK; REMODELING; &

RENOVATIONS

GROUP 1 - Brush; & Roller

GROUP 2 - Sandblasting & Buffing

GROUP 3 - Spray Painting; Closed Steel Above 55 feet; Bridges
& Open Structural Steel; Tanks - Water Towers; Bridge
Painters; Bridge Riggers; Containment Builders

GROUP 4 - Bridge Blaster

PAINTER CLASSIFICATIONS - COMMERCIAL REPAINT

GROUP 1 - Brush; & Roller

GROUP 2 - Sandblasting & Buffing

GROUP 3 - Spray Painting

PAI N0007-002 07/01/2019

FULTON, HENRY, LUCAS, OTTAWA (Excluding Allen, Bay, Bono,
Catawba Island, Clay Center, Curtice, Danbury, Eagle Beach,
Elliston, Elmore, Erie, Fishback, Gem Beach & Genova) & WOOD

Rates

Fringes

PAINTER

NEW COMMERCIAL WORK

GROUP 1.....	\$ 27.64	17.79
GROUP 2.....	\$ 27.39	17.79
GROUP 3.....	\$ 27.39	17.79
GROUP 4.....	\$ 27.39	17.79
GROUP 5.....	\$ 27.39	17.79
GROUP 6.....	\$ 27.39	17.79
GROUP 7.....	\$ 27.39	17.79
GROUP 8.....	\$ 27.39	17.79
GROUP 9.....	\$ 27.39	17.79

REPAINT IS 90% OF JR

PAINTER CLASSIFICATIONS

GROUP 1 - Brush; Spray & Sandblasting Pot Tender

GROUP 2 - Refineries & Refinery Tanks; Surfaces 30 ft. or
over where material is applied to or labor performed on
above ground level (exterior), floor level (interior)

GROUP 3 - Swing Stage & Chair

GROUP 4 - Lead Abatement

GROUP 5 - All Methods of Spray

GROUP 6 - Solvent-Based Catalyzed Epoxy Materials of 2 or
More Component Materials, to include Solvent-Based
Conversion Varnish (excluding water based)

GROUP 7 - Spray Solvent Based Material; Sand & Abrasive

Federal Rates HVY HWY 02062020

Blasting

GROUP 8 - Towers; Tanks; Bridges; Stacks Over 30 Feet

GROUP 9 - Epoxy Spray (excluding water based)

PAI N0012-008 05/01/2019

BUTLER COUNTY

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 21.95	10.20
GROUP 2.....	\$ 25.30	10.20
GROUP 3.....	\$ 25.80	10.20
GROUP 4.....	\$ 26.05	10.20
GROUP 5.....	\$ 26.30	10.20

PAINTER CLASSIFICATIONS

GROUP 1: Bridge Equipment Tender; Bridge/Containment Builder

GROUP 2: Brush & Roller

GROUP 3: Spray

GROUP 4: Sandblasting; & Waterblasting

GROUP 5: Elevated Tanks; Steeplejack Work; Bridge; & Lead Abatement

PAI N0012-010 05/01/2019

BROWN, CLERMONT, CLINTON, HAMILTON & WARREN

	Rates	Fringes
PAINTER		
HEAVY & HIGHWAY BRIDGES-		
GUARDRAILS-LIGHTPOLES-		
STRIPING		
Bridge Equipment Tender and Containment Builder....	\$ 21.95	10.20
Bridges when highest point of clearance is 60 feet or more; & Lead Abatement Projects.....	\$ 26.30	10.20
Brush & Roller.....	\$ 25.30	10.20
Sandblasting & Hopper Tender; Water Blasting.....	\$ 26.05	10.20
Spray.....	\$ 25.80	10.20

PAI N0093-001 12/01/2018

ATHENS, GUERNSEY, HOCKING, MONROE, MORGAN, NOBLE and WASHINGTON COUNTIES

Federal Rates HVY HWY 02062020

	Rates	Fri nges
PAI NTER		
Bri dges; Locks; Dams; Tensi on Towers; & Energized Substations.....	\$ 34.04	18.50
Power Generating Faci l i t i e s.	\$ 30.89	18.50

PAI N0249-002 05/01/2019

CLARK, DARKE, GREENE, MIAMI, MONTGOMERY & PREBLE

	Rates	Fri nges
PAI NTER		
GROUP 1 - Brush & Roller....	\$ 23.67	11.50
GROUP 2 - Swing, Scaffold Bridges; Structural Steel; Open Acid Tank; High Tensi on El ectri cal Equi pment; & Hot Pi pes.....	\$ 23.67	11.50
GROUP 3 - Spray; Sandbl ast; Steamcl ean; Lead Abatement.....	\$ 24.42	11.50
GROUP 4 - Steeplejack Work..	\$ 24.62	11.50
GROUP 5 - Coal Tar.....	\$ 25.17	11.50
GROUP 6 - Bridge Equi pment Tender & or Contai nment Bui l der.....	\$ 32.38	11.50
GROUP 7 - Tanks, Stacks & Towers.....	\$ 27.31	11.50
GROUP 8 - Bri dge Bl aster, Ri gger.....	\$ 35.38	11.50

PAI N0356-002 09/01/2009

KNOX, LI CKI NG, MUSKI NGUM, and PERRY

	Rates	Fri nges
PAI NTER		
Bri dge Equi pment Tenders and Contai nment Bui l ders....	\$ 27.93	7.25
Bri dges; Bl asters; andRi ggers.....	\$ 34.60	7.25
Brush and Roller.....	\$ 20.93	7.25
Sandbl asti ng; Steam Cl eani ng; Waterbl asti ng; and Hazardous Work.....	\$ 25.82	7.25
Spray.....	\$ 21.40	7.25
Structural Steel and Swing Stage.....	\$ 25.42	7.25
Tanks; Stacks; and Towers...	\$ 28.63	7.25

PAI N0438-002 12/01/2018

BELMONT, HARRI SON and JEFFERSON COUNTIES

	Rates	Fri nges
PAI NTER		
Bri dges, Locks, Dams,		

Federal Rates HVY HWY 02062020
Tension Towers & Energized
Substations.....\$ 32.80 17.68
Power Generating Facilities.\$ 29.65 17.68

PAI N0476-001 06/01/2019

COLUMBIANA, MAHONING, and TRUMBULL COUNTIES

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 25.82	16.58
GROUP 2.....	\$ 32.45	16.58
GROUP 3.....	\$ 26.03	16.58
GROUP 4.....	\$ 26.47	16.58
GROUP 5.....	\$ 26.47	16.58
GROUP 6.....	\$ 26.72	16.58
GROUP 7.....	\$ 27.82	16.58

PAINTER CLASSIFICATIONS:

GROUP 1: Painters, Brush & Roller

GROUP 2: Bridges

GROUP 3: Structural Steel

GROUP 4: Spray, Except Bar Joist/Deck

GROUP 5: Epoxy/Mastic; Spray- Bar Joist/Deck; Working Above
50 Feet; and Swingstages

GROUP 6: Tanks; Sandblasting

GROUP 7: Towers; Stacks

PAI N0555-002 06/01/2019

ADAMS, HIGHLAND, JACKSON, PIKE & SCIOTO

	Rates	Fringes
PAINTER		
GROUP 1.....	\$ 31.04	16.31
GROUP 2.....	\$ 32.50	16.31
GROUP 3.....	\$ 33.96	16.31
GROUP 4.....	\$ 36.82	16.31

PAINTER CLASSIFICATIONS

GROUP 1 - Containment Builder

GROUP 2 - Brush; Roller; Power Tools, Under 40 feet

GROUP 3 - Sand Blasting; Spray; Steam Cleaning; Pressure
Washing; Epoxy & Two Component Materials; Lead Abatement;
Hazardous Waste; Toxic Materials; Bulk & Storage Tanks of
25,000 Gallon Capacity or More; Elevated Tanks

GROUP 4 - Stacks; Bridges

PAI N0639-001 05/01/2011

	Rates	Fringes
Sign Painter & Erector.....	\$ 20.61	3.50+a+b+c

FOOTNOTES: a. 7 Paid Holidays: New Year's Day; Memorial Day; July 4th; Labor Day; Thanksgiving Day; Christmas Day & 1 Floating Day

b. Vacation Pay: After 1 year's service - 5 days' paid vacation; After 2, but less than 10 years' service - 10 days' paid vacation; After 10, but less than 20 years' service - 15 days' paid vacation; After 20 years' service - 20 days' paid vacation

c. Funeral leave up to 3 days maximum paid leave for death of mother, father, brother, sister, spouse, child, mother-in-law, father-in-law, grandparent and inlaw provided employee attends funeral

PAI N0788-002 06/01/2019

ASHLAND, CRAWFORD, ERIE, HANCOCK, HURON, MARION, MORROW, OTTAWA (Allen, Bay, Bono, Catawba Island, Clay Center, Curtice, Danbury, Eagle Beach, Elliston, Elmore, Erie, Fishback, Gem Beach & Genoa), RICHLAND, SANDUSKY, SENECA & WYANDOT

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 24.66	14.05
Structural Steel.....	\$ 26.26	14.05

WINTER REPAINT: Between December 1 to March 31 - 90%JR

\$.50 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

While working swingstage, boatswain chair, needle beam and horizontal cable. While operating sprayguns, sandblasting, cobblasting and high pressure waterblasting (4000psi).

\$1.00 PER HOUR SHALL BE ADDED TO THE RATE OF PAY FOR THE CLASSIFICATION OF WORK:

For the application of catalized epoxy, including latex epoxy that is deemed hazardous, lead abatement, or for work or material where special precautions beyond normal work duties must be taken. For working on stacks, tanks, and towers over 40 feet in height.

PAI N0813-005 12/01/2008

GALLIA, LAWRENCE, MEIGS & VINTON

	Rates	Fringes
PAINTER		
Base Rate.....	\$ 24.83	10.00
Bridges, Locks, Dams & Tension Towers.....	\$ 27.83	10.00

Federal Rates HVY HWY 02062020

PAI N0841-001 06/01/2018

MEDINA, PORTAGE (South of and including Ohio Turnpike), and
SUMMIT (South of and including Ohio Turnpike) COUNTIES

	Rates	Fringes
Painters:		
GROUP 1.....	\$ 25.75	14.35
GROUP 2.....	\$ 26.40	14.35
GROUP 3.....	\$ 26.50	14.35
GROUP 4.....	\$ 26.60	14.35
GROUP 5.....	\$ 27.00	14.35
GROUP 6.....	\$ 39.20	11.75
GROUP 7.....	\$ 27.00	14.35

PAINTER CLASSIFICATIONS:

GROUP 1 - Brush, Roller & Paperhanger

GROUP 2 - Epoxy Application

GROUP 3 - Swing Scaffold, Bosum Chair, & Window Jack

GROUP 4 - Spray Gun Operator of Any & All Coatings

GROUP 5 - Sandblast, Painting of Standpipes, etc. from
Scaffolds, Bridge Work and/or Open Structural Steel,
Standpipes and/or Water Towers

GROUP 6 - Public & Commerce Transportation, Steel or
Galvanized, Bridges, Tunnels & Related Support Items
(concrete)

GROUP 7 - Synthetic Exterior, Drywall Finisher and/or Taper,
Drywall Finisher and Follow-up Man Using Automatic Tools

PAI N0841-002 06/01/2018

CARROLL, COSHOCTON, HOLMES, STARK, TUSCARAWAS & WAYNE

	Rates	Fringes
PAINTER		
Bridges; Towers, Poles & Stacks; Sandblasting Steel; Structural Steel & Metalizing.....	\$ 22.78	13.63
Brush & Roller.....	\$ 21.77	13.63
Spray; Tank Interior & Exterior.....	\$ 22.60	13.63

PAI N1020-002 04/01/2019

ALLEN, AUGLAIZE, CHAMPAIGN, DEFIANCE, HARDIN, LOGAN, MERCER,
PAULDING, PUTNAM, SHELBY, VAN WERT, and WILLIAMS COUNTIES

Rates	Fringes
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Federal Rates HVY HWY 02062020

PAINTER

Brush & Roller.....	\$ 24.57	15.03
Drywall Finishing & Taping..	\$ 23.27	15.03
Lead Abatement.....	\$ 26.32	15.03
Spray, Sandblasting Pressure Cleaning, & Refinery.....	\$ 25.32	15.03
Swing Stage, Chair, Spiders, & Cherry Pickers...	\$ 24.82	15.03
Wall coverings.....	\$ 22.17	15.03

All surfaces 40 ft. or over where material is applied to or
labor performed on, above ground level (exterior), floor
level (interior) - \$.50 premium

Applying Coal Tar Products - \$1.00 premium

PAIN1275-002 05/01/2019

DELAWARE, FAIRFIELD, FAYETTE, FRANKLIN, MADISON, PICKAWAY, ROSS
& UNION

	Rates	Fringes
PAINTER		
Bridges.....	\$ 34.24	14.20
Brush; Roller.....	\$ 24.76	14.20
Sandblasting; Steamcleaning; Waterblasting (3500 PSI or Over)& Hazardous Work.....	\$ 25.46	14.20
Spray.....	\$ 25.26	14.20
Stacks; Tanks; & Towers.....	\$ 28.27	14.20
Structural Steel & Swing Stage.....	\$ 25.06	14.20

PLAS0109-001 05/01/2018

MEDINA, PORTAGE, STARK, and SUMMIT COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 28.86	17.11

PLAS0109-003 05/01/2018

CARROLL, HOLMES, TUSCARAWAS, and WAYNE COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 28.21	17.11

PLAS0132-002 05/01/2018

BROWN, BUTLER, CLERMONT, HAMILTON, HIGHLAND, WARREN COUNTIES

	Rates	Fringes
PLASTERER.....	\$ 28.86	17.11

PLAS0404-002 05/01/2018

Federal Rates HVY HWY 02062020

ASHTABULA, CUYAHOGA, GEauga, AND LAKE COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 29.63	17.11

PLAS0404-003 05/01/2018

LORAIN COUNTY

	Rates	Fri nges
PLASTERER.	\$ 28.86	17.11

PLAS0526-022 05/01/2018

COLUMBIANA, MAHONING, and TRUMBULL COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 28.86	17.11

PLAS0526-023 05/01/2018

BELMONT, HARRISON, and JEFFERSON COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 28.21	17.11

PLAS0886-001 05/01/2018

FULTON, HANCOCK, HENRY, LUCAS, PUTNAM, and WOOD COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 29.63	17.11

PLAS0886-003 05/01/2018

DEFIANCE, ERIE, HURON, OTTAWA, PAULDING, SANDUSKY, and SENECA COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 28.86	17.11

PLAS0886-004 05/01/2018

ALLEN, AUGLAIZE, HARDIN, LOGAN, MERCER, and VAN WERT COUNTIES

	Rates	Fri nges
PLASTERER.	\$ 28.21	17.11

PLUM0042-002 07/01/2018

ASHLAND, CRAWFORD, ERIE, HURON, KNOX, LORAIN, MORROW, RICHLAND & WYANDOT

Federal Rates HVY HWY 02062020
Rates Fri nges

Plumber, Pipefitter,
Steamfitter..... \$ 34.20 22.07

PLUM0050-002 07/01/2019

DEFIANCE, FULTON, HANCOCK, HENRY, LUCAS, OTTAWA, PAULDING,
PUTNAM, SANDUSKY, SENECA, WILLIAMS & WOOD

Rates Fri nges

Plumber, Pipefitter,
Steamfitter..... \$ 42.00 26.73

PLUM0055-003 04/29/2019

ASHTABULA, CUYAHOGA, GEAUGA, LAKE, MEDINA (N. of Rte. #18 &
Smith Road) & SUMMIT (N. of Rte. #303, including the corporate
limits of the city of Hudson)

Rates Fri nges

PLUMBER..... \$ 36.55 26.74

PLUM0083-001 07/01/2017

BELMONT & MONROE (North of Rte. #78)

Rates Fri nges

Plumber and Steamfitter..... \$ 32.16 31.51

PLUM0094-002 05/01/2019

CARROLL (Northern Half), STARK, and WAYNE COUNTIES

Rates Fri nges

PLUMBER/PIPEFITTER..... \$ 35.78 20.14

PLUM0120-002 04/30/2018

ASHTABULA, CUYAHOGA, GEAUGA, LAKE, LORAIN (the C.E.I. Power
House in Avon Lake), MEDINA (N. of Rte. #18) & SUMMIT (N. of
#303)

Rates Fri nges

PIPEFITTER..... \$ 37.67 22.42

PLUM0162-002 06/17/2019

CHAMPAIGN, CLARK, CLINTON, DARKE, FAYETTE, GREENE, MIAMI,
MONTGOMERY & PREBLE

Rates Fri nges

Plumber, Pipefitter,

	Federal Rates	HVY HWY	02062020
Steamfitter.....	\$ 31.25		24.37

 PLUM0168-002 06/01/2018

MEIGS, MONROE (South of Rte. #78), MORGAN (South of Rte. #78)
 & WASHINGTON

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 34.17	31.08

 PLUM0189-002 06/01/2018

DELAWARE, FAIRFIELD, FRANKLIN, HOCKING, LICKING, MADISON,
 MARION, PERRY, PICKAWAY, ROSS & UNION

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 36.20	23.74

 PLUM0219-002 05/31/2018

MEDINA (Rte. #18 from eastern edge of Medina Co., west to
 eastern corporate limits of the city of Medina, & on the county
 road from the west corporate limits of Medina running due west
 to and through community of Risley to the western edge of
 Medina County - All territory south of this line), PORTAGE, and
 SUMMIT (S. of Rte. #303) COUNTIES

	Rates	Fringes
Plumber and Steamfitter.....	\$ 37.02	23.79

 PLUM0392-002 06/01/2019

BROWN, BUTLER, CLERMONT, HAMILTON & WARREN

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 32.81	21.27

 PLUM0396-001 06/01/2019

COLUMBIANA (Excluding Washington & Yellow Creek Townships &
 Liverpool Twp. - Secs. 35 & 36 - West of County Road #427),
 MAHONING and TRUMBULL COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER.....	\$ 34.00	25.46

 PLUM0495-002 06/01/2018

CARROLL (Rose, Monroe, Union, Lee, Orange, Perry & Loudon
 Townships), COLUMBIANA (Washington & Yellow Creek Townships &
 Liverpool Township, Secs. 35 & 36, West of County Rd. #427),
 COSHOCTON, GUERNSEY, HARRISON, HOLMES, JEFFERSON, MORGAN (South
 to State Rte. #78 & from McConnellsville west on State Rte. #37

Federal Rates HVY HWY 02062020
to the Perry County line), MUSKINGUM, NOBLE, and TUSCARAWAS
COUNTIES

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 38.24	23.09

PLUM0577-002 06/01/2019

ADAMS, ATHENS, GALLIA, HIGHLAND, JACKSON, LAWRENCE, PIKE,
SCIOTO & VINTON

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 34.90	24.11

PLUM0776-002 08/01/2019

ALLEN, AUGLAIZE, HARDIN, LOGAN, MERCER, SHELBY and VAN WERT
COUNTIES

	Rates	Fringes
Plumber, Pipefitter, Steamfitter.....	\$ 36.64	24.73

TEAM0377-003 05/01/2019

STATEWIDE, EXCEPT CUYAHOGA, GEAUGA & LAKE

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 28.04	15.70
GROUP 2.....	\$ 28.46	15.70

TRUCK DRIVER CLASSIFICATIONS

GROUP 1 - Asphalt Distributor; Batch; 4- Wheel Service;
4-Wheel Dump; Oil Distributor & Tandem

GROUP 2 - Tractor-Trailer Combination: Fuel; Pole Trailer;
Ready Mix; Semi-Tractor; & Asphalt Oil Spraybar Man When
Operated From Cab; 5 Axles & Over; Belly Dump; End Dump;
Articulated Dump; Heavy Duty Equipment; Low Boy; & Truck
Mechanic

TEAM0436-002 05/01/2019

CUYAHOGA, GEAUGA & LAKE

	Rates	Fringes
TRUCK DRIVER		
GROUP 1.....	\$ 28.40	16.95
GROUP 2.....	\$ 28.90	16.95

GROUP 1: Straight & Dump, Straight Fuel

GROUP 2: Semi Fuel, Semi Tractor, Euclids, Darts, Tank, Asphalt Spreaders, Low Boys, Carry-All, Tourna-Rockers, Hi-Lifts, Extra Long Trailers, Semi-Pole Trailers, Double Hook-Up Tractor Trailers including Team Track & Railroad Siding, Semi-Tractor & Tri-Axle Trailer, Tandem Tractor & Tandem Trailer, Tag Along Trailer, Expandable Trailer or Towing Requiring Road Permits, Ready-Mix (Agitator or Non-Agitator), Bulk Concrete Driver, Dry Batch Truck, Articulated End Dump

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

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

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

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

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this

Federal Rates HVY HWY 02062020

classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

WAGE DETERMINATION APPEALS PROCESS

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

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

Federal Rates HVY HWY 02062020

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

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

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

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

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

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

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

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

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

=====

END OF GENERAL DECISION"

"General Decision Number: OH20200082 01/03/2020"

Superseded General Decision Number: OH20190082

State: Ohio

Construction Type: Building

County: Hamilton County in Ohio.

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

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

ASBE0008-010 07/01/2019

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 30.32	18.50

BROH0018-008 06/01/2019		

	Rates	Fringes
BRICKLAYER.....	\$ 28.66	14.66
TILE FINISHER.....	\$ 24.20	14.01
TILE SETTER.....	\$ 28.74	14.06

CARP0002-008 05/01/2017		

Rates	Fringes
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Federal Rates Building 02062020

CARPENTER (Acoustical Ceiling Installation Only).....\$ 24.04 15.29

CARP0002-014 05/01/2017

Rates Fringes

CARPENTER (Including Drywall Hanging, Metal Stud Installation and Form Work; Excludes Acoustical Ceiling Installation).....\$ 30.42 16.99

ELEC0212-010 06/03/2019

Rates Fringes

ELECTRICIAN (Excludes Low Voltage Wiring).....\$ 30.18 18.89

ELEV0011-002 01/01/2019

Rates Fringes

ELEVATOR MECHANIC.....\$ 45.73 33.705+a+b

PAID HOLIDAYS:

a. New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the Friday after Thanksgiving, and Christmas Day.

b. Employer contributes 8% of regular hourly rate to vacation pay credit for employee who has worked in business more than 5 years; 6% for less than 5 years' service.

ENGI 0018-036 05/01/2019

Rates Fringes

POWER EQUIPMENT OPERATOR
Backhoe/Excavator/Trackhoe;
Bulldozer; Crane.....\$ 37.14 15.20

ENGI 0018-037 05/01/2018

Rates Fringes

POWER EQUIPMENT OPERATOR
Bobcat/Skid Steer/Skid Loader.....\$ 35.89 15.09

ENGI 0066-045 06/01/2017

Rates Fringes

POWER EQUIPMENT OPERATOR
Forklift.....\$ 28.87 19.66
Grader/Bulldozer.....\$ 32.42 19.66
Mechanic.....\$ 32.92 19.66

IRON0044-003 06/01/2017

Federal Rates Building 02062020

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 27.60	20.70

IRON0044-019 06/01/2019		
	Rates	Fringes
IRONWORKER (Ornamental and Structural).....	\$ 29.47	21.20

LAB00265-017 06/01/2018		
	Rates	Fringes
LABORER Common or General.....	\$ 22.45	16.20

LAB00265-019 06/01/2018		
	Rates	Fringes
LABORER Mason Tender - Brick.....	\$ 21.95	16.20

* PAI N0123-001 05/01/2019		
	Rates	Fringes
PAINTER (Brush and Roller).....	\$ 25.30	10.20

PAI N0387-002 11/01/2017		
	Rates	Fringes
GLAZIER.....	\$ 26.00	14.15

PLAS0132-018 06/01/2019		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 24.50	14.60

PLAS0132-019 06/22/2018		
	Rates	Fringes
PLASTERER.....	\$ 24.25	14.65

PLUM0392-005 06/01/2019		
	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe Installation).....	\$ 32.81	21.27
PLUMBER (Excludes HVAC Pipe Installation).....	\$ 32.81	21.27

ROOF0042-007 08/01/2019		

Rates Fringes

Federal Rates Building 02062020

ROOFER. \$ 28.25 16.27

SFOH0669-009 04/01/2019

Rates Fringes

SPRINKLER FITTER (Fire
Sprinklers). \$ 37.78 23.55

SHEE0024-029 06/01/2019

Rates Fringes

SHEET METAL WORKER (Including
HVAC Duct Installation Only). . . . \$ 30.16 21.08

* UAVG-OH-0021 01/01/2019

Rates Fringes

OPERATOR: Oiler. \$ 27.56 16.37

SUOH2012-084 08/29/2014

Rates Fringes

ELECTRICIAN (Low Voltage
Wiring Only). \$ 22.28 8.63

LABORER: Asphalt, Includes
Raker, Shovel er, Spreader and
Distributor. \$ 26.19 8.99

LABORER: Landscape &
Irrigation. \$ 23.60 0.87

LABORER: Mason Tender -
Cement/Concrete. \$ 23.87 9.80

LABORER: Pipelayer. \$ 23.18 8.95

OPERATOR: Loader. \$ 29.66 12.61

OPERATOR: Paver (Asphalt,
Aggregate, and Concrete). \$ 30.28 13.29

OPERATOR: Roller. \$ 29.85 12.00

PAINTER: Spray. \$ 22.78 12.40

TRUCK DRIVER: Dump (All Types). . . \$ 24.32 11.73

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

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
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Federal Rates Building 02062020

employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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Federal Rates Building 02062020
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WAGE DETERMINATION APPEALS PROCESS

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Federal Rates Building 02062020
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U. S. Department of Labor
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Washington, DC 20210

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

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

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

=====

.. END OF GENERAL DECISION

SECTION 005000

AGREEMENT FORM

1. The Contract Form for this project will be AIA A132-2009 (modified).

END OF SECTION

DRAFT AIA® Document A132™ – 2009

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

AGREEMENT made as of the « » day of « » in the year «2020»
(In words, indicate day, month and year.)

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

«Board of County Commissioners, Hamilton County, Ohio »« »
« 603 County Administration Building »
«138 East Court Street »
«Cincinnati, Ohio 45202 »

And

City of Cincinnati, Ohio»
«801 Plum Street»
«Cincinnati, Ohio 45202 »

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

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

The Banks-Phase 3-B
Public Infrastructure and Park Development
Lot 23
TC-_____

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

Messer Construction Co. »« »
643 W. Court Street »
Cincinnati, Ohio 45203 »

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

THP Limited, Inc.
100 E. Eighth Street
Cincinnati, Ohio 45202

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This document is intended to be used in conjunction with AIA Documents A232™-2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™-2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser. ^AIA Document A232™-2009 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

{00308340-1} **ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS
10	INSURANCE AND BONDS
11	NOTICE PROVISIONS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than Modifications, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

§ 2.2 The Contractor represents to the Owner that all of the Work shall be performed for the Contract Sum set forth in Article 4 hereof, unless a change in the Work is required. A change in the Work is not warranted if the applicable portion of the Work was reasonably inferable from or contemplated by, or a prudent contractor should have realized that same was necessary or appropriate under the Contract Documents in existence as of the date of this Agreement. During performance of the Work, the Contractor agrees to use its best efforts, exercising its best and prudent judgment, to accomplish the Work in conformance with, and as required by or described by, or referred to in, the Contract Documents.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

« »

If, prior to the commencement of the Work, the Owner requires time to file mortgages, mechanics' liens and other security interests, the Owner's time requirement shall be as follows:

« »

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work by _____
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

« »

Portion of the Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

« »

§ 3.4 Time is of the essence to the Contract Documents and all obligations thereunder. If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.3

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be subject to additions and deductions as provided in the Contract Documents.

The Contract Sum shall be _____.

§ 4.1.1 Pursuant to the terms and conditions of the General Conditions, the Contractor shall prepare, for the Architect's approval, a detailed schedule of values (the "Schedule of Values") of the cost of the Contractor's Work, all elements of which will total the Contract Sum. The Schedule of Values shall categorize the Work in detail, as shown by the Contract Documents.

§ 4.1.2 The Contract Sum may be adjusted only for costs saved or incurred as a result of changes in the Work. All revisions of the Contract Sum will be made in accordance with Article 7 of General Conditions.

§ 4.1.3 The Contract Sum, as reflected in the Schedule of Values, includes all costs and expenses whatsoever arising from the Contractor's performance of the Work.

§ 4.1.4 The Contractor represents that it has based the Contract Sum on the exact materials specified in the Contract Documents. The Contract Sum is not contingent upon approval by Architect or Owner of "substitutes", as contemplated in Subparagraph 3.4.2 of the General Conditions. Any proposed substitution of materials after execution of this Agreement will be governed by the applicable provisions of the Contract Documents.

§ 4.2 Alternates

§ 4.2.2 Alternates, if any, accepted by the Owner and included in the Contract Sum.

§ 4.2.2 Item Price

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

« »

§ 4.2.3 Unit prices, if any:

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

Item	Units and Limitations	Price per Unit (\$0.00)
None		

§ 4.2.4 Allowances included in the Stipulated Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance
The Allowance shall be used as directed by the Owner. The unused portion of the Allowance shall be credited to the Owner via a deduct Change Order at Project completion.	

§ 4.3 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

<< >>

§ 4.4 Other:
(Insert provisions for bonus or other incentives, if any, which might result in a change to the Contract Sum.)

<< >>

§ 4.5 Where the Work involved is covered by unit prices contained in the Contract Documents, the value of any Work covered by a Change Order or Claim for an adjustment in the Contract Sum will be determined by application of such unit prices to the actual quantities of each scheduled item.

§ 4.6 The Construction Manager will determine the actual quantities and classifications of Unit Price Work performed by the Contractor. The Construction Manager will review with Contractor the Construction Manager's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). The Construction Manager's written decision thereon will be final and binding (except as modified by the Construction Manager to reflect changed factual conditions or more accurate data) upon Owner and Contractor.

§ 4.7 Each unit price will be deemed to include an amount considered by the Contractor to be adequate to cover the Contractor's overhead and profit for each separately identified item.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and upon certification of the Project Application and Project Certificate for Payment or Application for Payment and Certificate for Payment by the Construction Manager and Architect and issuance by the Construction Manager, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

<< >>

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the 25th day of a month, the Owner shall make payment of the certified amount in the Application for Payment to the Contractor not later than the 30th day of the following month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment shall be made by the Owner not later than sixty (60) days after the Construction Manager receives the Application for Payment.

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

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum

§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.4.2 The amount of each progress payment shall first include:

1. That portion of the Contract Sum properly allocable to completed Work;
2. That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
3. That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.4.3 The amount of each progress payment shall then be reduced by:

1. The aggregate of any amounts previously paid by the Owner;
2. The amount, if any, for Work that remains incorrect and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document 232-2009;
3. Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
4. For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document 232-2009; and
5. Retainage withheld pursuant to Section 5.1.4.4.

§ 5.1.4.4 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.4.3.1 and 5.1.4.3.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

<< >>

§ 5.1.4.5 Progress payments made to Contractor shall be subject to the following:

(1) for labor performed prior to Substantial Completion of the Work, the progress payment shall be reduced by eight percent (8%) and made at the rate of ninety-two percent (92%) of the Schedule of Values prepared by the Contractor and approved by the Architect; and

(2) provided the materials have been inspected and found to meet the specifications, the progress payment for materials delivered to and suitably stored at the Project site shall be reduced by eight percent (8%) and made at the rate of ninety-two percent (92%) of the Schedule of Values prepared by the Contractor and approved by the Architect. The retained balance shall be paid when such material is incorporated into and becomes a part of the Project.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 of AIA Document A232-2009, and to satisfy other requirements, if any, which extend beyond final payment;
- .2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit A, Determination of the Cost of the Work when payment is on the basis of the Cost of the Work, with or without a Guaranteed Maximum payment; and
- .3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

<< >>

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A232-2009, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

<< >>

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<< >>

<< >>

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A232-2009, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

☒ Litigation in a court of competent jurisdiction.

☐ Other: *(Specify)*

<< >>

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2009.

§ 7.1.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232-2009.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A232-2009 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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

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

<< >> % << >>

§ 8.3 The Owner's representative:

(Name, address and other information)

Phil Beck
Construction Project Executive – The Banks
138 E. Court Street
Suite 603
Cincinnati, Ohio 45202

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

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

§ 8.6 Other provisions:

«§ 8.6.1 The Contractor must verify all materials, equipment and labor entering into the Work for conformance with the Contract Documents and must keep such full and detailed accounts as may be necessary for proper financial management under the Contract. The system and method of accounting is subject to Architect's approval. Architect and Owner, and their agents and employees, will be afforded access to all the Contractor's records, books, correspondence, instructions, receipts, vouchers, memoranda, and similar data relating to the Contract, and the Contractor must preserve all such records and provide such access for a period of three (3) years after the date of Substantial Completion.

§ 8.6.2 All references throughout the Contract Document to the term "Architect" are hereby replaced by the term "Engineer".»
»

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A132–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, as amended.

§ 9.1.2 The General Conditions are AIA Document A232–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as amended and including insurance requirements set forth on Exhibit 1 to the General Conditions

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

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

Such specifications as set forth in the Banks – Phase 3 B Public Infrastructure Development

Section	Title	Date	Pages

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

The drawings appended to the Project Manual dated _____ and incorporated herein. Also see the drawing index set forth in Section 000115 of the Project Manual.

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

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

.1 The following documents executed and submitted by the Contractor for the Project shall be deemed a part of the Contract Documents:

Document Number	Title	Pages
001000.4	Bid Form	
001000.5	Contract Bond	
001000.6	Certificate of Compliance	
001000.7	Non-Collusion Affidavit of Contractor	
001000.8	Bidder's Certification Concerning Equal Employment Opportunity Requirements	
001000.9	Personal Property Tax Statements	
0010010.10	Subcontractor and Material Supplier List	
001000.12	SBE/DBE Subcontractor Utilization Plan	
001000.13	Statement of Good Faith Efforts	
001000.14	SBE/DBE Outreach & Good Faith Efforts Summary Sheet	
001000.15	Warranty Against an Unresolved Finding For Recovery	
001000.17	Responsible Bidder Certification	
001000.22	Registration Form	

.2 The following documents contained in the Project Manual dated _____ shall be deemed a part of the Contract Documents:

Document Number	Title	Pages
00101	Cover Page	
00110	Project Manual Index	
00115	Drawing Index	
00125	Project Directory	
001000.1	Advertisement for Bids (Legal Notice)	
001000.2	Instructions to Bidders	
001000.3	Additional Bid Conditions	
001000.11	Disadvantaged Business Enterprise Program Summary	
001000.18	Tax Exempt Statement Sheet	
001000.23	Prevailing Wage Rates (Including Appendix A)	
006150	Escrow Agreement	
008100	Project Safety Program	
008260	Joint Policy for Small Business Enterprise,	

008270	Economic Inclusion and Workforce Development (including Subcontractor Monthly Business Utilization Report Form 2005 & Subcontractor Substitution Form 2006) Responsible Bidder Requirements Applicable to Public Contracts
009000	Contract Construction Management Forms (including Change Order Form AIA G701/CMa as amended and modified. Application and Certificate for Payment Form AIA G702/CMa as amended and modified. Continuation Sheet AIA G703CMa as amended and modified, Certificate of Substantial Completion Form AIA G704/CMa as amended and modified, Contractor's Affidavit of Payment of Debts and Claims Form AIA G706/CMa as amended and modified, Contractor's Affidavit of Release of Liens Form AIA G706A/CMa as amended and modified, Consent of Surety to Final Payment Form AIA G707 as amended and modified, Contractor's Affidavit, Sub-Contractor Affidavit and Waiver of Lien, Construction Change directive Form AIA G714/CMa as amended and modified.

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A232–2009 and as set forth in Exhibit 1 to A232.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A232–2009.)

Type of Insurance or Bond	Limit of Liability or Bond Amount (\$0.00)
Performance Payment Bond	Amount equal to Contract Sum

ARTICLE 11 NOTICE

§ 11.1 Whenever it shall be necessary or desirable to give notice of any kind it shall be in writing. Either party may, by notice of the other, designate a different address to which notices shall be sent or change authorized personnel hereafter designated. On behalf of the Construction Manager, the City, the County and the Contractor, only the following personnel are authorized to sign and receive notices and any and all other documents.

If to Construction Manager	Bob Inkrot, Operations Manager Messer Construction Co. 643 W. Court Street Cincinnati, Ohio 45203
If to County:	Phil Beck Construction Project Executive-The Banks Hamilton County 603 Administration Building 138 E. Court Street Cincinnati, Ohio 45202
If to City:	City Manager City of Cincinnati 801 Plum Street, Room 152 Cincinnati, Ohio 45202
With Copies to:	Roger E. Friedmann Assistant Prosecuting Attorney 230 E. Ninth Street, Eighth Floor Cincinnati, Ohio 45202 Thomas L. Gabelman Frost, Brown Todd LLC 301 East Fourth Street Great American Tower Suite 3300 Cincinnati, Ohio 45202 Kaitlyn Geiger Supervising Attorney City of Cincinnati Law Department – Economic Development 801 Plum Street, Room 214 Cincinnati, Ohio 45202

If to Contractor:

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

Board of County Commissioners of Hamilton County, Ohio

OWNER (Signature)

CONTRACTOR (Signature)

Jeff Aluotto, County Administrator
(Printed name and title)

(Printed name and title)

Patrick A. Duhaney, City Manager
(Printed name and title)

Approved as to Form:

Roger E. Friedmann
Assistant Prosecuting Attorney

Approved as to Form:

Assistant City Solicitor

0126293.0603325 4824-4980-6004v1



THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

SECTION 006100
CONTRACT BOND
(Section 153.57 Ohio Revised Code)

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____

(Here insert full name and address or legal title of Contractor)

as Principal and _____
(Here insert full name or legal title of Surety)

as Surety, are hereby held and firmly bound unto The Board of County Commissioners Hamilton County and City of Cincinnati Ohio, and Messer Construction Co., hereinafter called the Obligee, in the penal sum of

_____ dollars (\$_____),

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

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above Principal did on the

_____ day of _____, 20____, file with the Obligee, a proposal for the erection and completion of:

NOW, THEREFORE, after awarding of the said contract in accordance with the proposal, plans, details, specifications and bills of material, which said proposal faithfully perform each and every condition of such contract and indemnify the Obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications and bills of material therefor; and pay all lawful claims of subcontractors, materialmen and laborers, for labor performed or material furnished in carrying forward, performing or completing of said contract, we agreeing and assenting that this undertaking shall be for the benefit of any subcontractor, materialmen or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of said contract or in or to the plans and specifications therefor shall in any wise affect the obligations of said Surety on this bond, and does hereby waive notice of any modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

SIGNED AND SEALED This _____ day of _____, 20____

Principal

By: _____

Title: _____

Surety

By: _____
Attorney-in-Fact

Surety company address

Surety Agent's name and address

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

SECTION 006150
ESCROW AGREEMENT

Agreement made on _____, _____, between The Board of County Commissioners, Hamilton County, Ohio, hereinafter called County, the City of Cincinnati, Ohio, hereinafter called City, and _____, hereinafter called escrow agent.

WHEREAS, the County, City and _____, hereinafter called contractor, have entered into a contract identified as _____; and,

WHEREAS, Section 153.12, et. seq., Ohio Revised Code, requires the County and the City to retain certain funds due to the Contractor in order to assure completion of the Project which is the subject of the above mentioned contract; and,

WHEREAS, Section 153.63, Ohio Revised Code, provides for the placement of funds retained by the County and the City in an escrow account;

NOW, therefore, it is agreed that:

1. County, City and Contractor agree to employ _____, to act as escrow agent in connection with funds retained by the County and City pursuant to the provisions of the contract identified as _____.
2. The escrow account shall be opened on or before _____, _____, with the deposit by the County and City with the escrow agent, the sum of _____ dollars. The escrow agent shall deposit such funds with the _____
(Bank) (Savings & loan)
in an interest earning savings account.
3. The escrow agent shall hold the escrowed principal and income until receipt of notice from the County, the City and the Contractor, or until receipt of an arbitration order specifying the amount of the escrowed principal to be released and the person to whom it is to be released. Upon receipt of the notice or order, the agent shall promptly pay such amount of principal and a proportionate amount of the escrowed income to the person indicated.
4. The escrow agent may commingle the escrowed funds with funds held pursuant to other escrowed agreements.
5. The escrow agent shall be paid nothing, for its services.

IN WITNESS WHEREOF, the parties have executed this agreement at _____
on the _____ day of _____, _____.

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

The Board of County Commissioners, Hamilton County, Ohio

By: _____
County Administrator

Witness

Witness

The City of Cincinnati, Ohio

By: _____
City Manager

Witness

Witness

By: _____
Contractor

Witness

Witness

_____ hereby accepts employment
as escrow and hereby agrees to meet the obligations and perform the duties of escrow agent as set forth in
the foregoing agreement.

Date: _____

Escrow Agent

CONTRACTOR INSURANCE REQUIREMENTS

FORM B (Contractors)

Board of Commissioners of Hamilton County Ohio requires that all Contractors submit a Certificate of Insurance prior to commencement of work that fully complies with the requirements of the Agreement. Failure to provide the certificate with the proper coverage and limits will result in delayed payment to the Contractor. The following is an outline of the insurance that must be provided and so indicated on the Contractor's certificate of insurance.

Commercial General Liability Insurance

Contractor shall carry Comprehensive/Commercial General Liability and if necessary Commercial Umbrella insurance written on Insurance Service Office (ISO) form CG 00 01 or its equivalent with limits not less than those indicated below as required by this Contract or Agreement covering all operations by or on behalf of Contractor providing insurance for bodily injury liability and property damage liability including coverage for:

1. Premises and operations
2. Products and completed operations
3. Contractual liability insuring the obligations assumed by Contractor in this Agreement
4. Broad form property damage (including completed operations)
5. Personal and advertising injury liability
6. Explosion, collapse, underground and subsidence hazards (no XCU exclusions are acceptable)
7. Independent contractor liability
8. EIFS (applies only to contractors providing this scope of work)
9. Incidental Medical Malpractice
10. Severability of interests
11. Waiver of subrogation

The limits of liability shall be not less than these amounts required of Contractor under the Contract Documents:

\$1,000,000 Each Occurrence (combined single limit for bodily injury and property damage)
 \$1,000,000 Personal Injury
 \$3,000,000 Products-Completed Operations Aggregate
 \$3,000,000 General Aggregate

- The general aggregate limit shall apply on a per project basis to Contractor's work under this Agreement per ISO endorsement CG 25 03.

Products-Completed Operations coverage must be maintained for a minimum period of five years from Substantial Completion of the project and provide coverage for Contractor and all Additional Insureds listed below.

Comprehensive Automobile Liability Insurance covering liability arising out of any auto (owned, hired and non-owned) providing limits of liability of not less than:

\$1,000,000 combined single limit for bodily injury and property damage – each accident

If your contracted work requires the removal and transportation of hazardous materials from the project site, your Auto liability coverage must be amended to include pollution liability coverage applicable to all hazardous waste hauling vehicles and include the MCS90 endorsement.

Workers Compensation and Employer's Liability

Workers Compensation -State of Ohio Statutory Limits and requirements as defined in Ohio Revised Code 4123

This work is performed in Ohio and is a State of Ohio project, therefore an Ohio Bureau of Workers' Compensation (OBWC) approved Drug Free Work Place policy is required.

Ohio Employer's Liability –You must, in addition to the above requirements, carry Ohio Employer's Liability coverage with limits of not less than \$1,000,000 per occurrence and in the aggregate. Such coverage must not contain any exclusionary language that removes coverage for "substantially certain to occur" claims.

If your work involves ANY employment on or adjacent to navigable waterways, then the workers' compensation policy must be endorsed to include U.S. Longshore and Harborworkers (USL&H) and Jones Act coverages as applicable.

Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.

Umbrella / Excess Liability Insurance

Contractor shall maintain Umbrella and Excess Liability insurance on an occurrence basis in excess of the Commercial General Liability insurance, and Business Automobile Liability insurance, which is at least as broad as each of the underlying policies. The Contractors Umbrella and Excess Liability shall contain coverage for:

1. Pay on behalf of wording
2. Concurrency of effective dates with primary policies
3. Blanket contractual liability
4. Punitive damages coverage (where not prohibited by law)
5. Aggregates: apply where applicable in primary
6. Care, custody, and control – follow form primary
7. Drop down feature
8. Waiver of subrogation

The limits of liability shall not be less than these amounts:

\$5,000,000 Each Occurrence

\$5,000,000 Aggregate

Additional Insured Requirements

Description of Operations: The Banks – Phase 3B, Public Infrastructure Development – Parking Garage and Street Grid

The Owner (Board of County Commissioners Hamilton County Ohio), Construction Manager (Messer), the City of Cincinnati and Engineer (THP Limited), and each entities' officers, directors, employees, agents, and mortgagees shall be named as additional insureds under the Contractor's CGL and Automobile policies for any liability arising out of the performance of the Work. Waiver of Subrogation applies in favor of additional insureds.

Coverage under the CGL for all required Additional Named Insureds shall be provided by a policy provision or by an endorsement providing coverage at least as broad as Additional Insured endorsement form GC 20 10 published by ISO.

General Insurance Requirements

- Certificate Holder shall be Board of Commissioners of Hamilton County Ohio and certificate of insurance is to be mailed to Hamilton County, Risk Manager, Room 707, 138 East Court Street, Cincinnati, OH 45202. The name of the project "Banks Garage / Infrastructure shall be placed on the certificate. Copies of the certificate and supporting forms showing compliance with the insurance requirements must be provided prior to commencement of work. Certificate shall be reissued when any insurance coverage contained therein is renewed.
- Contractor's policies shall be endorsed to provide that there will be no cancellation or reduction in coverage without thirty (30) days prior written notice to Board of Commissioners of Hamilton County Ohio
- Contractor shall ensure that all tiers of their subcontractors shall procure and maintain insurance in like form and adequate amounts including Additional Insured requirements, all as set forth in the Contractor Insurance Requirements agreement.
- Contractor's insurance shall be primary and non-contributing with respect to any insurance or self-insurance programs carried by Board of Commissioners of Hamilton County Ohio or any of the Additional Insureds.
- Umbrella Excess Liability in combination with primary liability coverages and limits as outlined above to satisfy the required limits of liability is acceptable.
- Umbrella / Excess liability coverage used in conjunction with primary policies shall have concurrency of effective dates with underlying policies; drop down feature, and; "Pay on behalf of" wording.
- Contractor shall provide Board with copy of current OBWC Certificate of Premium Payment prior to commencement of work and upon each renewal date.

The Banks – Phase 3B
Lot 23 Garage and Lot 27 Garage Fit-Out
Bid Package #6 – February 21, 2020

SECTION 007200

GENERALCONDITIONS

1. General Conditions AIA A232-2009 amended is included and attached.

The Banks – Phase 3B
Lot 23 Garage and Lot 27 Garage Fit-Out
Bid Package #6 – February 21, 2020

END OF SECTION

007200 - 1

DRAFT AIA® Document A232™ – 2009

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

«The Banks
Public Infrastructure Development
Phase 3B - Lot 23/27 Garage & Race St. Turnaround
Bid Package 6: Lot 23 Park, Lot 23/27 Garage Signage and Security»

« »

THE CONSTRUCTION MANAGER:

(Name, legal status and address)

Messer Construction Co. »« »
643 W. Court Street »
Cincinnati, Ohio 45203 »« »
« »

THE OWNER:

(Name, legal status and address)

«Board of County Commissioners, Hamilton County, Ohio »« »
« 603 County Administration Building »
«138 East Court Street »
«Cincinnati, Ohio 45202 »

And

City of Cincinnati, Ohio»
«801 Plum Street»
«Cincinnati, Ohio 45202 » »« »
« »

THE ARCHITECT:

(Name, legal status and address)

THP Limited, Inc.
100 E. Eighth Street
Cincinnati, Ohio 45202

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

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

This document is intended to be used in conjunction with AIA Documents A132™-2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™-2009, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2009, Standard Form of Agreement Between Owner and Construction Manager as Adviser.



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TABLE OF ARTICLES

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



INDEX

(Topics and numbers in bold are section headings.)

Acceptance of Nonconforming Work

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

Access to Work

3.16, 6.2.1, **12.1**

Accident Prevention

10

Acts and Omissions

3.2.1, 3.2.2, 3.3.2, 3.12.8, 3.18, 8.3.1, 9.5.1, 10.1, 10.2.5, 13.4.2, **13.7**

Addenda

1.1.1, 3.11, 4.2.14

Additional Costs, Claims for

3.2.4, 3.7.4, 3.7.5, 6.1.1, 7.3, 9.10.3, 9.10.4, 10.3, 10.4, 15.1.4

Additional Inspections and Testing

4.2.8, 12.2.1, **13.5**

Additional Insured

11.1.4

Additional Time, Claims for

3.7.4, 3.7.5, 6.1.1, 7.3, 8.3, **10.3**

Administration of the Contract

3.10, **4.2**

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.19

Allowances

3.8, 7.3.8

All-risk Insurance

11.3.1, 11.3.1.1

Applications for Payment

4.2.7, 4.2.15, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.7, 9.8.3, 9.10.1, 9.10.3, 9.10.5, 11.1.3, 14.2.4

Approvals

2.1.1, 2.2.2, 2.4, 3.1.4, 3.10.1, 3.10.2, 3.12.4 through 3.12.10, 3.13.2, 3.15.2, 4.2.9, 9.3.2, 13.4.2, **13.5**

Arbitration

8.3.1, 11.3.10, 13.1, 15.3.2, **15.4**

ARCHITECT

4

Architect, Certificates for Payment

9.4

Architect, Definition of

4.1.1

Architect, Extent of Authority

5.2, 7.1.2, 7.3.7, 7.4, 9.3.1, 9.4, 9.5, 9.8.3, 9.8.4, 9.10.1, 9.10.3, 12.1, 12.2.1, 13.5.1, 13.5.2, 15.1.3, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.8, 4.2.1, 4.2.2, 4.2.8, 4.2.13, 5.2.1, 9.6.4, **15.2**

Architect's Additional Services and Expenses

2.4, 11.3.1.1, 12.2.1, 12.2.4, **13.5.2**

Architect's Administration of the Contract

4.2, 9.4, 9.5, **15.2**

Architect's Approvals

3.12.8

Architect's Authority to Reject Work

4.2.8, 12.1.2, 12.2.1

Architect's Copyright

1.5

Architect's Decisions

4.2.8, 7.3.9, 7.4, 8.1.3, 8.3.1, 9.2, 9.4, 9.5, 9.8.3, 9.9.2, 13.5.2, 14.2.2, 14.2.4, **15.2**

Architect's Inspections

3.7.4, 4.2, 9.8.3, 9.9.2, 9.10.1, **13.5**

Architect's Instructions

3.2.4, 7.4, 9.4

Architect's Interpretations

4.2.8, 4.2.17, 4.2.18

Architect's On-Site Observations

4.2.2, 9.4, 9.5.1, 9.10.1, 12.1.1, 12.1.2, **13.5**

Architect's Project Representative

4.2.16

Architect's Relationship with Contractor

1.1.2, 1.5, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2, 3.5, 3.7.4, 3.9.2, 3.9.3, 3.10, 3.11, 3.12.8, 3.16, 3.18, 4.2, 5.2, 6.2.2, 8.2, 11.3.7, 12.1, **13.5**

Architect's Relationship with Construction Manager

1.1.2, 9.3 through 9.10, 10.3, **13.5.1**, 10.3, 11.3.7, 13.4.2, **13.5.4**

Architect's Relationship with Subcontractors

1.1.2, 4.2.8, 5.3, 9.6.3, 9.6.4

Architect's Representations

9.4, 9.5, 9.10.1

Architect's Site Visits

4.2.2, 9.4, 9.5.1, 9.8.3, 9.9.2, 9.10.1, **13.5**

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.10.2, 10.3.3

Award of Other Contracts

6.1.1, 6.1.2

Award of Subcontracts and Other Contracts for Portions of the Work

5.2

Basic Definitions

1.1

Bidding Requirements

1.1.1, 5.2.1, 11.4.1

Binding Dispute Resolution

9.7, 11.3.9, 11.3.10, 13.1, 15.2.5, 15.2.6.1, 15.3.1, 15.3.2, **15.4.1**

Boiler and Machinery Insurance

11.3.2

BONDS, INSURANCE AND

11

Bonds, Lien

7.3.7.4, 9.10.3

Bonds, Performance and Payment

7.3.7.4, 9.6.7, 9.10.3, 11.3.9, 11.4

Building Permit

2.2.2, 3.7.1

Capitalization

1.3

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

Certificates for Payment

4.2.2, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3,

15.1.3

Certificates of Inspection, Testing or Approval

13.5.4

Certificates of Insurance

9.3.2, 9.10.2, 11.1.3

Change Orders

1.1.1, 2.4, 3.4.2, 3.7.4, 3.8.2, 3.11, 3.12.8, 4.2.12,

4.2.13, 4.2.14, 5.2.3, 7.1.1, 7.1.2, **7.2**, 7.3.2, 7.3.4,

7.3.6, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2,

11.3.1.2, 11.3.4, 11.3.9, 12.1.2, 15.1.3

Change Orders, Definition of

7.2

Changes

7.1

CHANGES IN THE WORK

2.2.1, 3.4.2, 3.11, 3.12.8, 4.2.13, 4.2.14, **7**, 8.3.1,

9.3.1.1

Claims, Definition of

15.1.1

CLAIMS AND DISPUTES

1.1.8, 3.2.4, 3.7.5, 6.1.1, 7.3.9, 8.3.2, 9.3.3, 9.10.3,

9.10.4, 10.3.3, **15**, 15.4

Claims for Additional Cost

3.2.4, 3.7.5, 6.1.1, 7.3.9, 9.10.3, 9.10.4, 10.3.2, 10.4,

15.1.4

Claims for Additional Time

3.2.4, 3.7.5, **7**, 8.3.2, 10.4, **15.1.5**

Concealed or Unknown Conditions, Claims for

3.7

Claims for Damages

3.2.4, 3.18, 6.1.1, 6.2.5, 8.3.2, 9.3.3, 9.5.1.2, 9.10.2,

9.10.5, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 15.1.6

Cleaning Up

3.15, 6.3

Commencement of Statutory Limitation Period

13.7

Commencement of the Work, Definition of

8.1.2

Communications, Owner to Architect

2.2.6

Communications, Owner to Construction Manager

2.2.6

Communications, Owner to Contractor

2.2.6

Communications Facilitating Contract

Administration

3.9.1, **4.2.6**

COMPLETION, PAYMENTS AND

9

Completion, Substantial

4.2.15, 8.1.1, 8.1.3, 8.2.3, 9.4.3.3, **9.8**, 9.9.1, 9.10.3,

12.2.1, 12.2.2, 13.7

Concealed or Unknown Conditions

3.7.4, 4.2.8, 8.3.1, 10.3

Conditions of the Contract

1.1.1

Consolidation or Joinder

15.4.4

CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

1.1.4, **6**

Construction Change Directive, Definition of

7.3.1

Construction Change Directives

1.1.1, 3.4.2, 3.12.8, 4.2.12, 4.2.13, 7.1.1, 7.1.2, 7.1.3,

7.3, 9.3.1.1

Construction Manager, Building Permits

2.2.2

Construction Manager, Communications through

4.2.6

Construction Manager, Construction Schedule

3.10.1, 3.10.3

CONSTRUCTION MANAGER

4

Construction Manager, Definition of

4.1.2

Construction Manager, Documents and Samples at the Site

3.11

Construction Manager, Extent of Authority

3.12.7, 3.12.8, 4.1.3, 4.2.1, 4.2.4, 4.2.5, 4.2.9, 7.1.2,

7.2, 7.3.1, 8.3, 9.3.1, 9.4.1, 9.4.2, 9.4.3, 9.8.2, 9.8.3,

9.8.4, 9.9.1, 12.1, 12.2.1, 14.2.2, 14.2.4

Construction Manager, Limitations of Authority and Responsibility

4.2.5, 4.2.8, 13.4.2

Construction Manager, Submittals

4.2.9

Construction Manager's Additional Services and Expenses

12.2.1

Construction Manager's Administration of the Contract

4.2, 9.4, 9.5

Construction Manager's Approval

2.4, 3.10.1, 3.10.2

Construction Manager's Authority to Reject Work

4.2.8, 12.2.1

Construction Manager's Decisions

7.3.7, 7.3.9, 9.4.1, 9.5.1

Construction Manager's Inspections

4.2.8, 9.8.3, 9.9.2

Construction Manager's On-Site Observations
9.5.1

Construction Manager's Relationship with Architect
1.1.2, 4.2.1, 4.2.7, 4.2.8, 4.2.9, 4.2.13, 4.2.15, 4.2.16,
4.2.20, 9.2.1, 9.4.2, 9.5, 9.6.1, 9.6.3, 9.8.2, 9.8.3,
9.8.4, 9.9.1, 9.10.1, 9.10.2, 9.10.3, 11.1.3, 12.2.4,
13.5.1, 13.5.2, 13.5.4, 14.2.2, 14.2.4

Construction Manager's Relationship with Contractor
3.2.2, 3.2.3, 3.3.1, 3.5, 3.10.1, 3.10.2, 3.10.3, 3.11,
3.12.5, 3.12.6, 3.12.7, 3.12.8, 3.12.9, 3.12.10, 3.13.2,
3.14.2, 3.15.2, 3.16, 3.17, 3.18.1, 4.2.4, 4.2.5, 4.2.6,
4.2.9, 4.2.14, 4.2.17, 4.2.20, 5.2, 6.2.1, 6.2.2, 7.1.2,
7.2, 7.3.5, 7.3.7, 7.3.10, 8.3.1, 9.2, 9.3.1, 9.4.1, 9.4.2,
9.7, 9.8.2, 9.8.3, 9.8.4, 9.9.1, 9.10.1, 9.10.2, 9.10.3,
10.1, 10.3, 11.3.7, 12.1, 13.5.1, 13.5.2, 13.5.3, 13.5.4

Construction Manager's Relationship with Owner
2.2.2, 4.2.1, 10.3.2

Construction Manager's Relationship with Other
Contractors and Owner's Own Forces
4.2.4

Construction Manager's Relationship with
Subcontractors
4.2.8, 5.3, 9.6.3, 9.6.4

Construction Manager's Site Visits
9.5.1

Construction Schedules, Contractor's
3.10, 3.12.1, 3.12.2, 6.1.2, 15.1.5.2

Contingent Assignment of Subcontracts
5.4, 14.2.2.2

Continuing Contract Performance
15.1.3

Contract, Definition of
1.1.2

**CONTRACT, TERMINATION OR
SUSPENSION OF THE**
5.4.1.1, 11.3.9, 14

Contract Administration
3.1.3, 4.2, 9.4, 9.5

Contract Award and Execution, Conditions Relating
to
3.7.1, 3.10, 5.2, 6.1, 11.1.3, 11.3.6, 11.4.1

Contract Documents, Copies Furnished and Use of
1.5.2, 2.2.5, 5.3

Contract Documents, Definition of
1.1.1

Contract Performance During Arbitration
15.1.3

Contract Sum
3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.2, 7.3, 7.4, **9.1**, 9.2,
9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.3.1.1, 12.3, 14.2.4,
14.3.2, 15.1.4, 15.2.5

Contract Time
3.7.4, 3.7.5, 4, 3.10.2, 5.2.3, 7.2.3, 7.3.1, 7.3.5,
7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7,
10.3.2, 12.1.1, 14.3.2, 15.1.5.1, 15.2.5

Contract Time, Definition of
8.1.1

CONTRACTOR

3

Contractor, Definition of

3.1.1

Contractor's Construction Schedules

3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.5.2

Contractor's Employees

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3,
11.1.1, 11.3.7, 14.1, 14.2.1.1

Contractor's Liability Insurance

11.1

Contractor's Relationship with Other Contractors and
Owner's Own Forces

3.12.5, 3.14.2, 4.2.6, 6, 11.3, 12.1.2, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 3.3.2, 3.18, 5, 9.6.2, 9.6.7, 9.10.2, 11.3.1.2,
11.3.7, 11.3.8, 14.2.1.2

Contractor's Relationship with the Architect

1.1.2, 1.5, 3.2.2, 3.2.3, 3.2.4, 3.4.2, 3.5, 3.7.4, 3.10.1,
3.11, 3.12, 3.16, 3.18, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3,
9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3.7, 12, 13.5,
15.1.2, 15.2.1

Contractor's Relationship with the Construction
Manager

1.1.2, 3.2.2, 3.2.3, 3.3.1, 3.5, 3.10.1, 3.10.2, 3.10.3,
3.11, 3.12.5, 3.12.7, 3.12.9, 3.12.10, 3.13.2, 3.14.2,
3.15.1, 3.16, 3.17, 3.18.1, 4.2.4, 4.2.5, 5.2, 6.2.1,
6.2.2, 7.1.2, 7.3.5, 7.3.7, 7.3.10, 8.3.1, 9.2, 9.3.1,
9.4.1, 9.4.2, 9.8.2, 9.9.1, 9.10.1, 9.10.2, 9.10.3, 10.1,
10.2.6, 10.3, 11.3.7, 12.1, 13.5.1, 13.5.2, 13.5.3,
13.5.4

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the
Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

9.7

Contractor's Right to Terminate the Contract

14.1

Contractor's Submittals

3.10.2, 3.11, 3.12, 4.2.9, 9.2, 9.3, 9.8.2, 9.9.1, 9.10.2,
9.10.3, 11.1.3, 11.4.2

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction
Procedures

1.2.2, 3.3, 3.4, 4.2.5, 4.2.7, 6.1, 6.2.4, 7.1.3, 7.3.5,
7.3.7, 8.2, 10, 12, 14, 15.1.3

Contractual Liability Insurance

11.1.1.8, 11.2, 11.3.1.5

Coordination and Correlation

1.2, 3.2, 3.3.1, 3.10, 3.12.6, 6.1.2, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.2.5, 3.11

Copyrights

1.5, 3.17

Correction of Work

2.3, 2.4, 9.4.1, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, **12.2**

Correlation and Intent of the Contract Documents

1.2

Costs

2.4, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3, 7.3.3.3, 7.3.6, 7.3.7, 7.3.8, 7.3.9, 11.3.1.2, 11.3.1.3, 11.3.4, 11.3.9, 12.1, 12.2.1, 13.5, 14

Cutting and Patching

3.14, 6.2.5

Damage to Construction of Owner or Other

Contractors

3.14.2, 6.2.4, 9.5.1.5, 10.2.1.2, 10.2.5, 10.4, 11.1.1, 11.3, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 11.3.1, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.2, 10.3.3, 11.1.1, 11.3.5, 11.3.7, 14.2.4, 15.1.6

Damages for Delay

6.1.1, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 15.1.5

Date of Commencement of the Work, Definition of

8.1.2

Date of Substantial Completion, Definition of

8.1.3

Day, Definition of

8.1.4

Decisions of the Architect

3.7.4, 4.2.7, 4.2.8, 4.2.10, 4.2.11, 4.2.13, 4.2.15, 4.2.16, 4.2.17, 4.2.18, 4.2.19, 4.2.20, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5, 9.8.3, 9.8.4, 9.9.1, 10.1.2, 13.5.2, 14.2.2, 14.2.4, 15.1, 15.2

Decisions of the Construction Manager

7.3.7, 7.3.8, 7.3.9, 15.1, 15.2

Decisions to Withhold Certification

9.4.1, **9.5**, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance, Rejection and Correction of

2.3, 2.4, 3.5, 4.2.8, 6.2.5, 9.5.1, 9.6.6, 9.8.2, 9.9.3, 9.10.4, 12.2.1, 12.2.2

Definitions

1.1, 2.1.1, 3.1.1, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 4.1.2, 7.2, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

Delays and Extensions of Time

3.2, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, **8.3**, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.5, 15.2.5

Disputes

7.3.8, 7.3.9, 9.3, 15.1, 15.2

DISPUTES, CLAIMS AND

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, **15**, 15.4

Documents and Samples at the Site

3.11

Drawings, Definition of

1.1.5

Drawings and Specifications, Ownership and Use

1.1.1, **1.5**, 2.2.5, 3.11, 5.3

Duty to Review Contract Documents and Field Conditions

3.2

Effective Date of Insurance

8.2.2, 11.1.2

Emergencies

10.4, 14.1.1.2, 15.1.4

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.1, 3.18.2, 4.2.3, 4.2.6, 10.2, 10.3.3, 11.1.1, 11.3.7, 14.1, 14.2.1.1

Equipment, Labor, Materials and or

1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.13.1, 3.15.1, 4.2.8, 4.2.7, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.2

Execution and Progress of the Work

1.1.3, 1.2.1, 1.2.2, 2.2.3, 2.2.5, 3.1, 3.3.1, 3.4.1, 3.5, 3.7.1, 3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.5, 8.2, 9.5.1, 9.9.1, 10.2, 10.3, 12.2, 14.2, 14.3.1, 15.1.3

Extensions of Time

3.2.4, 3.7.4, 5.2.3, 7.2.3, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.5, 15.2.5

Failure of Payment

9.5.1.3, **9.7**, 13.6, 14.1.1.3, 14.1.3, 14.2.1.2, 15.1.4

Faulty Work (See Defective or Nonconforming Work)

Final Completion and Final Payment

4.2.1, 4.2.15, 9.8.2, **9.10**, 11.1.2, 11.1.3, 11.3.1, 11.3.5, 12.3, 15.2.1

Financial Arrangements, Owner's

2.2.1

GENERAL PROVISIONS

1

Governing Law

13.1

Guarantees (See Warranty and Warranties)

Hazardous Materials

10.2.4, **10.3**

Identification of Contract Documents

1.2.1

Identification of Subcontractors and Suppliers

5.2.1

Indemnification

3.18, 9.10.2, 10.3.3, 10.3.5, 10.3.6, 11.3.1.2, 11.3.7

Information and Services Required of the Owner

2.1.2, **2.2**, 4.2.6, 6.1.2, 6.2.5, 9.6.1, 9.6.4, 9.8, 9.9.1, 9.10.3, 10.3.2, 10.3.3, 11.2, 11.3.4, 13.5.1, 13.5.2, 14.1.1.4, 14.1.3, 15.1.2

Initial Decision

15.2

Initial Decision Maker, Definition of

1.1.8

Initial Decision Maker, Extent of Authority

14.2.2, 14.2.4, 15.1.3, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Injury or Damage to Person or Property

3.18.1, 10.2.1, 10.2.2, **10.2.8**, 10.3, 10.3.3, 10.4, 11.1.1

Inspections

3.1.3, 3.7.1, 4.2.2, 9.8.2, 9.9.2, 9.10.1, 13.5

Instructions to Bidders
1.1.1
Instructions to the Contractor
3.1.4, 3.3.3, 3.7.1, 4.2.4, 5.2.1, 7, 8.2.2, 12.1, 13.5.2
Instruments of Service, Definition of
1.1.7, 1.5, 1.6
Insurance
6.1.1, 7.3.7, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, 11
Insurance, Boiler and Machinery
11.3.2
Insurance, Contractor's Liability
11.1
Insurance, Effective Date of
8.2.2, 11.1.2
Insurance, Loss of Use
11.3.3
Insurance, Owner's Liability
11.2
Insurance, Property
10.2.5, 11.3
Insurance, Stored Materials
9.3.2, 11.3.1
INSURANCE AND BONDS
11
Insurance Companies, Consent to Partial Occupancy
9.9.1, 11.3.1.5
Insurance Companies, Settlement with
11.3.10
Intent of the Contract Documents
1.2, 4.2.18, 4.2.19, 7.4
Interest
9.7, 13.6
Interpretation
1.4, 4.2.8, 4.2.17, 4.2.18
Interpretations, Written
4.2.17, 4.2.18, 4.2.20
Joinder and Consolidation of Claims Required
15.4.4
Judgment on Final Award
15.4.2
Labor and Materials, Equipment
1.1.3, 1.1.6, 3.4, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.12.6, 3.12.10, 3.13.1, 3.15.1, 5.2.1, 6.2.1, 7.3.7, 9.3.2, 9.3.3, 9.5.1.3, 9.6, 9.10.2, 10.2.1.2, 11.3.1, 14.2.1, 14.2.2
Labor Disputes
8.3.1
Laws and Regulations
3.2.3, 3.2.4, 3.7, 3.13.1, 10.2.2, 10.2.3, 13.5.1, 14.2.1
Liens
2.1.2, 9.3.3, 9.10.2, 9.10.4, 15.2.8
Limitation on Consolidation or Joinder
15.4.4
Limitations, Statutes of
15.4.1
Limitations of Authority
3.12.4, 4.1.3, 4.2.16

Limitations of Liability
9.6.7, 11.1.1, 12.2
Limitations of Time
3.10.1, 4.2.17, 4.2.20, 8.2.1, 9.3.3, 9.6.1, 9.8.4, 9.10.2, 10.2, 11.1.3, 12.1.1, 12.2.2.2, 12.2.5, 13.7, 14.1.1, 15.2.6.1
Loss of Use Insurance
11.3.3
Material Suppliers
1.5.1, 1.5.2, 3.12, 4.2.6, 4.2.8, 9.3.1, 9.3.1.2, 9.3.3, 9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.5, 11.3.1
Materials, Hazardous
10.2.4, 10.3
Materials, Labor, Equipment and
1.1.3, 1.1.6, 1.5.1, 1.5.2, 3.4, 3.5, 3.8.2, 3.8.3, 3.12.2, 3.12.3, 3.12.6, 3.12.10, 3.13.1, 5.2.1, 6.2.1, 9.3.1, 9.3.2, 9.3.3, 9.5.1, 9.5.3, 9.6.4, 9.6.5, 9.6.7, 9.10.2, 9.10.5, 10.2.1, 10.2.4, 10.3
Means, Methods, Techniques, Sequences and Procedures of Construction
3.3.1, 3.12.10, 4.2.5, 4.2.11
Mechanic's Lien
2.1.2, 15.2.8
Mediation
8.3.1, 10.3.5, 15.2.1, 15.2.5, 15.2.6, 15.3, 15.4.1
Minor Changes in the Work
1.1.1, 3.12.8, 4.2.13, 7.1, 7.4
MISCELLANEOUS PROVISIONS
13
Modifications, Definition of
1.1.1
Modifications to the Contract
1.1.1, 1.1.2, 3.11, 4.1.3, 4.2.14, 5.2.3, 7, 11.3.1
Mutual Responsibility
6.2
Nonconforming Work, Acceptance of
9.4.3, 9.8.3, 12.3
Nonconforming Work, Rejection and Correction of
2.3, 2.4, 3.2.3, 3.7.3, 9.4.3.3, 9.8.2, 9.8.3, 9.9.1, 11.1.1, 12.2.2.1, 12.2.3, 12.2.4, 12.2.5
Notice
1.5, 2.1.2, 2.2.1, 2.4, 3.2.4, 3.3.1, 3.7.1, 3.7.2, 3.7.5, 3.9.2, 3.12.9, 5.2.1, 6.3, 9.4.1, 9.7, 9.10.1, 9.10.2, 10.2.2, 10.2.6, 10.2.8, 10.3.2, 11.3.6, 12.2.2.1, 13.3, 13.5.1, 13.5.2, 14.1.2, 14.2.2, 14.4.2, 15.1.2, 15.1.4, 15.1.5.1, 15.2, 15.4.1
Notice of Claims
3.7.2, 10.2.8, 15.1.2, 15.4.1
Notice of Testing and Inspections
13.5.1, 13.5.2
Notices, Permits, Fees and
3.7, 7.3.7, 10.2.2
Observations, On-Site
3.2.1, 9.5.1, 12.1.1
Occupancy
2.2.2, 9.6.6, 9.9, 11.3.1.5
On-Site Inspections
4.2.2, 9.10.1, 9.4.4, 9.5.1

Orders, Written
4.2.7, 4.2.18, 4.2.20
Other Contracts and Contractors
1.1.4, 3.14.2, 4.2.9, 6, 11.3.7, 12.1.2
OWNER
2
Owner, Definition of
2.1.1
Owner, Information and Services Required of the
2.1.2, **2.2**, 4.2, 6.1.2, 6.1.3, 6.2.5, 9.3.2, 9.6.1, 9.6.4,
9.9.2, 9.10.2, 10.3.3, 11.2, 11.3, 13.5.1, 13.5.2,
14.1.1, 14.1.3, 15.1.3
Owner's Authority
1.5, 2.1.1, 2.3, 2.4, 3.4.2, 3.12.10, 3.14.2, 4.1.2, 4.1.3,
4.2.8, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2, 7.3.1,
8.2.2, 9.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2,
11.3.3, 11.3.10, 12.2.2.1, 12.3, 13.5.2, 14.2, 14.3.1,
14.4, 15.2.7
Owner's Financial Capability
2.2.1, 13.2.2, 14.1.1
Owner's Liability Insurance
11.2
Owner's Relationship with Subcontractors
1.1.2, 5.2.1, 5.3, 5.4.1, 9.6.4, 9.10.2, 14.2.2
Owner's Right to Carry Out the Work
2.4, 12.2.4, 14.2.2
Owner's Right to Clean Up
6.3
Owner's Right to Perform Construction with Own
Forces and to Award Other Contracts
6.1
Owner's Right to Stop the Work
2.3
Owner's Right to Suspend the Work
14.3
Owner's Right to Terminate the Contract
14.2
Ownership and Use of Drawings, Specifications
and Other Instruments of Service
1.1.1, 1.1.5, **1.5**, 1.6, 3.11, 3.12.10, 3.17, 4.2.14,
4.2.18, 4.2.20
Partial Occupancy or Use
9.9, 11.3.1.5
Patching, Cutting and
3.14, 6.2.5
Patents and Copyrights, Royalties
3.17
Payment, Applications for
4.2.1, 4.2.7, 4.2.15, 7.3.9, 9.2, **9.3**, 9.4, 9.5, 9.7,
9.10.1, 9.10.3, 9.10.5, 11.1.3
Payment, Certificates for
4.2.15, 7.3.9, 9.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1,
9.10.3, 14.1.1.3, 15.1.3
Payment, Failure of
9.4.1, 9.5, **9.7**, 14.1.1.3
Payment, Final
4.2.1, 9.8.2, **9.10**, 11.1.2, 11.3.1, 11.3.5, 12.3, 15.2.1

Payment Bond, Performance Bond and
5.4.1, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, **11.4**
Payments, Progress
9.3.1, 9.4.2, **9.6**
PAYMENTS AND COMPLETION
9, 14
Payments to Subcontractors
5.4.2, 9.3, 9.5.1.3, 9.5.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7,
9.10.5, 14.2.1.2
PCB
10.3.1
Performance Bond and Payment Bond
5.4.1, 7.3.7, 9.6.7, 9.10.2, 9.10.3, 11, **11.4**
Permits, Fees, Notices and Compliance with Laws
2.2.2, **3.7**, 7.3.7.4, 10.2.2
PERSONS AND PROPERTY, PROTECTION
OF
10
Polychlorinated Biphenyl
10.3.1
Product Data, Definition of
3.12.2
Product Data and Samples, Shop Drawings
3.11, **3.12**, 4.2.9, 4.2.10, 4.2.14
Progress and Completion
8.2, 9.3.1, 9.4.2, 9.6, 9.8, 9.10, 14.2.4, 15.1.6
Progress Payments
9.3.1, 9.4.2, **9.6**
Project, Definition of
1.1.4
Project Representatives
4.2.16
Property Insurance
10.2.5, **11.3**
Project Schedule
3.10.1, 3.10.3, 3.10.4, 4.2.2, 4.2.3, 4.2.4
PROTECTION OF PERSONS AND PROPERTY
10
Regulations and Laws
1.5, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 4.1.1, 9.6.4, 9.9.1,
10.2.2, 11.1, 11.4, 13.1, 13.4, 13.5.1, 13.5.2, 13.6,
14.1.1, 14.2.1, 15.2.8, 15.4
Rejection of Work
3.5, 4.2.8, 12.2.1
Releases of and Waivers and of Liens
9.10.2
Representations
1.3, 2.2.1, 3.5, 3.12, 6.2.2, 8.2.1, 9.3.3, 9.4.3, 9.5.1,
9.8.2, 9.10.1
Representatives
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.1, 4.2.2, 4.2.10, 5.1.1,
5.1.2, 13.2.1
Requests for Information
4.2.20
Resolution of Claims and Disputes
15

Responsibility for Those Performing the Work
3.3.2, 3.7.3, 3.12.8, 3.18, 4.2.2, 4.2.5, 4.2.8, 5.3,
6.1.2, 6.2, 6.3, 9.5.1, 9.8.2, 10
Retainage
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3
**Review of Contract Documents and Field
Conditions by Contractor**
1.2.2, **3.2**, 3.7.3, 3.12.7
Review of Contractor's Submittals by Owner,
Construction Manager and Architect
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 5.2, 9.2, 9.8.2
Review of Shop Drawings, Product Data and
Samples by Contractor
3.12.5
Rights and Remedies
1.1.2, 2.3, 2.4, 3.7.4, 3.15.2, 4.2.8, 5.3, 5.4, 6.1, 6.3,
7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.2,
12.2.4, **13.4**, 14, 15.4
Royalties, Patents and Copyrights
3.17
Rules and Notices for Arbitration
15.4
Safety of Persons and Property
10.2, 10.3, 10.4
Safety Precautions and Programs
3.3.1, 3.12, 4.2.5, 5.3, **10.1**, 10.2, 10.3, 10.4
Samples, Definition of
3.12.3
Samples, Shop Drawings, Product Data and
3.11, **3.12**, 4.2.9, 4.2.10
Samples at the Site, Documents and
3.11
Schedule of Values
9.2, 9.3.1
Schedules, Construction
3.10, 3.12.1, 3.12.2, 6.1.2, 15.1.5.2
Separate Contracts and Contractors
1.1.4, 3.12.5, 3.14.2, 4.2.6, 4.2.11, 6, 8.3.1, 12.1.2
Shop Drawings, Definition of
3.12.1
Shop Drawings, Product Data and Samples
3.11, **3.12**, 4.2.9, 4.2.10, 4.2.14
Site, Use of
3.13, 6.1.1, 6.2.1
Site Inspections
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2.2, 4.2.3, 4.2.15, 9.4.3.3,
9.8.3, 9.9.2, 9.10.1, 13.5
Site Visits, Architect's
3.7.4, 4.2.2, 4.2.15, 9.8.3, 9.9.2, 9.10.1, 13.5
Special Inspections and Testing
4.2.8, 12.2.1, 13.5
Specifications, Definition of
1.1.6
Specifications
1.1.1, **1.1.6**, 1.2.2, 1.5, 3.11, 3.12.10, 3.17, 4.2.14
Staffing Plan
4.2.3

Statute of Limitations
12.2.5, 13.7, 15.4.1.1
Stopping the Work
2.3, 9.7, 10.3, 14.1
Stored Materials
6.2.1, 9.3.2, 10.2.1.2, 10.2.4
Subcontractor, Definition of
5.1.1
SUBCONTRACTORS
5
Subcontractors, Work by
1.2.2, 3.3.2, 3.12.1, 4.2.5, 5.2.3, 5.3, 5.4, 9.3.1.2,
9.6.7
Subcontractual Relations
5.3, 5.4, 9.3.1.2, 9.6.2, 9.6.3, 9.10, 10.2.1, 14.1, 14.2
Submittals
3.2.3, 3.10, 3.11, 3.12, 4.2.9, 4.2.10, 4.2.11, 5.2.1,
5.2.3, 7.3.7, 9.2, 9.3, 9.8, 9.9.1, 9.10.2, 9.10.3, 11.1.3
Submittal Schedule
3.10.2, 3.12.5, 4.2.9, 4.2.10
Subrogation, Waivers of
6.1.1, **11.3.7**
Substantial Completion
8.1.1, 8.1.3, 8.2.3, 9.4.3.3, **9.8**, 9.9.1, 9.10.3, 12.2.1,
12.2.2, 13.7
Substantial Completion, Definition of
9.8.1
Substitution of Subcontractors
5.2.3, 5.2.4
Substitution of Architect
4.1.4
Substitution of Construction Manager
4.1.4
Substitutions of Materials
3.4.2, 3.5, 7.3.8
Sub-subcontractor, Definition of
5.1.2
Subsurface Conditions
3.7.4
Successors and Assigns
13.2
Superintendent
3.9, 10.2.6
Supervision and Construction Procedures
1.2.2, **3.3**, 3.4, 3.12.10, 4.2.2, 4.2.3, 4.2.5, 4.2.8,
4.2.9, 4.2.10, 4.2.11, 6.1.3, 6.2.4, 7.1.3, 7.3.7, 8.2,
8.3.1, 9.4.3.3, 10, 12, 14, 15.1.3
Surety
5.4.1.2, 9.8.5, 9.10.2, 9.10.3, 14.2.2, 15.2.7
Surety, Consent of
9.10.2, 9.10.3
Surveys
1.1.7, 2.2.3
Suspension by the Owner for Convenience
14.3
Suspension of the Work
5.4.2, 14.3

Suspension or Termination of the Contract
5.4.1.1, 14
Taxes
3.6, 3.8.2.1, 7.3.7.4
Termination by the Contractor
14.1, 15.1.6
Termination by the Owner for Cause
5.4.1.1, 14.2, 15.1.6
Termination by the Owner for Convenience
14.4
Termination of the Contractor
14.2.2
TERMINATION OR SUSPENSION OF THE CONTRACT
14
Tests and Inspections
3.1.4, 3.3.3, 4.2.2, 4.2.6, 4.2.8, 9.4.3.3, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.5
TIME
8
Time, Delays and Extensions of
3.2.4, 3.7.4, 5.2.3, 7.2, 7.3.1, 7.4, 8.3, 9.5.1, 10.3.2, 14.3.2, 15.1.5, 15.2.5
Time Limits
2.1.2, 2.2, 2.4, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.1, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.4.2, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 11.1.3, 11.4, 12.2, 13.5, 13.7, 14, 15
Time Limits on Claims
3.7.4, 10.2.8, 13.7, 15.1.2
Title to Work
9.3.2, 9.3.3
Transmission of Data in Digital Form
1.6
UNCOVERING AND CORRECTION OF WORK
12
Uncovering of Work
12.1
Unforeseen Conditions, Concealed or Unknown
3.7.4, 8.3.1, 10.3

Unit Prices
7.3.3.2, 7.3.4
Use of Documents
1.1.1, 1.5, 2.2.5, 3.12.6, 5.3
Use of Site
3.13, 6.1.1, 6.2.1
Values, Schedule of
9.2, 9.3.1
Waiver of Claims by the Architect
13.4.2
Waiver of Claims by the Construction Manager
13.4.2
Waiver of Claims by the Contractor
9.10.5, 13.4.2, 15.1.6
Waiver of Claims by the Owner
9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.4.2, 14.2.4, 15.1.6
Waiver of Consequential Damages
14.2.4, 15.1.6
Waiver of Liens
9.10.2, 9.10.4
Waivers of Subrogation
6.1.1, 11.3.7
Warranty
3.5, 4.2.15, 9.3.3, 9.8.4, 9.9.1, 9.10.4, 12.2.2
Weather Delays
15.1.5.2
Work, Definition of
1.1.3
Written Consent
1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.3, 9.3.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 10.3.2, 11.4.1, 13.2, 13.4.2, 15.4.4.2
Written Interpretations
4.2.17, 4.2.18
Written Notice
2.3, 2.4, 3.3.1, 3.9, 3.12.9, 3.12.10, 5.2.1, 5.3, 5.4.1.1, 8.2.2, 9.4, 9.5.1, 9.7, 9.10, 10.2.2, 10.3, 11.1.3, 12.2.2, 12.2.4, 13.3, 13.5.2, 14, 15.4.1
Written Orders
1.1.1, 2.3, 3.9, 7, 8.2.2, 12.1, 12.2, 13.5.2, 14.3.1, 15.1.2

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents. The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement), and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of addenda relating to bidding requirements).

§ 1.1.2 The Contract. The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and the Construction Manager or the Construction Manager's consultants, (3) between the Owner and the Architect or the Architect's consultants, (4) between the Contractor and the Construction Manager or the Construction Manager's consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties.

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

§ 1.1.4 The Project. The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by other Multiple Prime Contractors and by the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

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

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

§ 1.1.8 Initial Decision Maker. The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 Correlation and Intent of the Contract Documents

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

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Transmission of Data in Digital Form

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Article 4, the Construction Manager and the Architect do not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

§ 2.2 Information and Services Required of the Owner

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.2.6 The Owner shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents.

§ 2.3 Owner's Right to Stop the Work

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

§ 2.4 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect, after consultation with the Construction Manager. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

§ 3.1.4 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Construction Manager or Architect in their administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instruction concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner, the Construction Manager, and the Architect and shall not proceed with that portion of the Work without further written instructions from the Architect, through the Construction Manager. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

§ 3.3.3 The Contractor shall be responsible for inspection of portions of the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

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

§ 3.5 Warranty

The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform with the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 Taxes

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

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

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

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner, Construction Manager, and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect, in consultation with the Construction Manager, determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner, Construction

Manager, and Contractor in writing, stating the reasons. If the Owner or Contractor disputes the Architect's determination or recommendation, either party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner and Architect through the Construction Manager, the name and qualifications of a proposed superintendent. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager, or the Architect has reasonable objection to the proposed superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and the Construction Manager's approval a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter update it as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Construction Manager's and Architect's approval. The Architect and Construction Manager's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall participate with other Contractors, the Construction Manager and Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager. The Contractor shall make revisions to the construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project schedule.

§ 3.10.4 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner, Construction Manager and Architect and incorporated into the approved Project schedule.

§ 3.11 Documents and Samples at the Site

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These documents shall be available to the Architect and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.9 through 4.2.11. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Construction Manager Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the Project submittal schedule approved by the Construction Manager and Architect, or in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples and similar submittals with related documents submitted by other Multiple Prime Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner, Construction Manager, and Architect, that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed and approved by the Architect.

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 Use of Site

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

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager before using any portion of the site.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner's own forces or of other Multiple Prime Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner's own forces or by other Multiple Prime Contractors except with written consent of the Construction Manager, Owner and such other Multiple Prime Contractors; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the other Multiple Prime Contractors or the Owner the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

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

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

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

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

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

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

§ 4.1.4 If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner and Construction Manager (1) known deviations from the Contract Documents and from the most recent Project schedule prepared by the Construction Manager, and (2) defects and deficiencies observed in the Work.

§ 4.2.3 The Construction Manager shall provide a staffing plan to include one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. The Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner reasonably informed of the progress of the Work, and will report to the Owner and Architect (1) known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work.

§ 4.2.4 The Construction Manager will schedule and coordinate the activities of the Contractor and other Multiple Prime Contractors in accordance with the latest approved Project schedule.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and Architect will not have control over, or charge of, construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of or be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Communications by and with the Owner's own forces shall be through the Owner.

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents and will notify each other about the rejection. The Construction Manager shall determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written

authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work.

§ 4.2.9 The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data and Samples. Where there are Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.11 Review of the Contractor's submittals by the Construction Manager and Architect is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Construction Manager and Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Construction Manager and Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Construction Manager and Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.12 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.13 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7. and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.14 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.15 The Construction Manager will assist the Architect in conducting inspections to determine the dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

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

§ 4.2.17 The Architect will interpret and decide matters concerning performance under, and requirements of the Contract Documents on written request of the Construction Manager, Owner or Contractor through the Construction Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

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

§ 4.2.20 The Construction Manager will receive and review requests for information from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing to the Construction Manager to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include other Multiple Prime Contractors or subcontractors of other Multiple Prime Contractors.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Construction Manager for review by the Owner, Construction Manager and Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Construction Manager may reply within 14 days to the Contractor in writing stating (1) whether the Owner, the Construction Manager or the Architect has reasonable objection to any such proposed person or entity or, (2) that the Construction Manager, Architect or Owner requires additional time for review. Failure of the Construction Manager, Owner, or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's

Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner, Construction Manager or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor Contractor or other entity. If the Owner assigns the subcontract to a successor Contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor Contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY OTHER CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager, the Owner shall provide for coordination of such forces with the Work of the Contractor, who shall cooperate with them.

§ 6.1.3 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations

and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11 and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner's own forces, Construction Manager and other Multiple Prime Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

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

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a separate contractor or to other Multiple Prime Contractors because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces or other Multiple Prime Contractors.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and other Multiple Prime Contractors shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, other Multiple Prime Contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Construction Manager, with notice to the Architect, will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.2 Change Orders

A Change Order is a written instrument prepared by the Construction Manager and signed by the Owner, Construction Manager, Architect and Contractor, stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

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

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Construction Manager shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Construction Manager and Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment.

The Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified. The interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Construction Manager and Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Construction Manager shall prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order issued through the Construction Manager and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by other causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

§ 9.2 Schedule of Values

Where the Contract is based on a Stipulated Sum or Guaranteed Maximum Price, the Contractor shall submit to the Construction Manager, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. In the event there is one Contractor, the Construction Manager shall forward to the Architect the Contractor's schedule of values. If there are Multiple Prime Contractors responsible for performing different portions of the Project, the Construction Manager shall forward the Multiple Prime Contractors' schedules of values only if requested by the Architect.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner, Construction Manager or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Construction Manager and Architect, but not yet included in Change Orders.

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

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

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either issue to the Owner a Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there are Multiple Prime Contractors performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives the Multiple Prime Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Multiple Prime Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Multiple Prime Contractors' application with information from similar applications for progress payments from other Multiple Prime Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Multiple Prime Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect.

§ 9.4.3 Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager, for such amount as the Architect determines is properly due, or notify the Construction Manager and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.4 The Construction Manager's certification of an Application for Payment or, in the case of Multiple Prime Contractors, a Project Application and Certificate for Payment shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of the Application for Payment. The Construction Manager's certification will constitute a representation that, to the best of the Construction Manager's knowledge, information and belief, the Work has progressed to the point indicated and the quality of the Work is in accordance with the Contract Documents. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.

§ 9.4.5 The Architect's issuance of a Certificate for Payment or in the case of Multiple Prime Contractors, Project Application and Certificate for Payment, shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of the Application for Payment or Project Application for Payment. The Architect's certification will constitute a representation that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated, that the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified.

§ 9.4.6 The representations made pursuant to Sections 9.4.4 and 9.4.5 are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Construction Manager or Architect.

§ 9.4.7 The issuance of a separate Certificate for Payment or a Project Certificate for Payment will not be a representation that the Construction Manager or Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed the Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.4 and 9.4.5 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.3. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment or a Project Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence or subsequent observations, may nullify the whole or a part of a Certificate for Payment or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the acts and omissions described in Section 3.3.2 because of

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

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

§ 9.5.3 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Construction Manager and both will reflect such payment on the next Certificate for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment or Project Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Construction Manager and Architect.

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

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

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner, Construction Manager nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor except as may otherwise be required by law.

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

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

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

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

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

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

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

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

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect after consultation with the Construction Manager.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

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

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

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors.

The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

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

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

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

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4, except damage or loss attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.3 Hazardous Materials

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to, asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner, Construction Manager and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify a presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resumed upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

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

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

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

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Liability Insurance

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by

a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

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

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations; and (3) Ohio Department of Natural Resources, Ohio Public Facilities Commission and the Treasurer of the State of Ohio.

§ 11.2 Owner's Liability Insurance

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

§ 11.3 Property Insurance

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an “all-risk” or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect’s, Contractor’s, and Construction Manager’s services and expenses required as a result of such insured loss.

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

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

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

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

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

§ 11.3.3 **Loss of Use Insurance.** The Owner, at the Owner’s option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner’s property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner’s property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, adjoining or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days’ prior written notice has been given to the Contractor.

§ 11.3.7 **Waivers of Subrogation.** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees each of the other, and (2) the Construction Manager, Architect, Architect’s consultants, separate contractors described in Article 6, if any, and any of their subcontractors,

sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as the Owner and Contractor may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or distribution of insurance proceeds in accordance with the direction of the arbitrators.

§ 11.4 Performance Bond and Payment Bond

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their observation and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered which the Construction Manager or Architect has not specifically requested to observe prior to its being covered, the Construction Manager or Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or one of the other Contractors in which event the Owner shall be responsible for payment of such costs.

§ 12.2 Correction of Work

§ 12.2.1 Before or After Substantial Completion

The Contractor shall promptly correct Work rejected by the Construction Manager or Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Construction Manager's and Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

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

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

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

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

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

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the

other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 Written Notice

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity or to an officer of the corporation for which it was intended; or if delivered at or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 Rights and Remedies

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

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

§ 13.5 Tests and Inspections

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

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

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

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

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

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

§ 13.6 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 Time Limits on Claims

The Owner and the Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and the Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Construction Manager has not certified or the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner, Construction Manager and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

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

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

§ 14.2.2 When any of the above reasons exist, the Owner, after consultation with the Construction Manager, and upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without

prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

§ 14.3 Suspension by the Owner for Convenience

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

§ 14.3.2 The Contract Sum and the Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent:

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of this Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 Notice of Claims. Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Construction Manager and Architect, if the Construction Manager and or Architect is not serving as the Initial Decision Maker. Claims by either party must be

initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 Continuing Contract Performance. Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Construction Manager will prepare Change Orders and the Architect will issue a Certificate for Payment or Project Certificate for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 Claims for Additional Cost. If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.3.

§ 15.1.5 Claims for Additional Time

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay only one Claim is necessary.

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

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

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

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

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

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect and Construction Manager, if the Architect or Construction Manager is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

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

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based

on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

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

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

SECTION 008100

PROJECT SAFETY PROGRAM

PART 1 - GENERAL

- 1.1 The following provides a summary of Contractor's Safety Program requirements regarding worker safety and/or campus safety.
- 1.2 This summary should in no way be construed as being all-inclusive. It is issued as a guide to aid each Subcontractor in their understanding of the safety expectations on this project.

PART 2 - PRE-CONSTRUCTION SAFETY MEETING

- A. A project specific safety plan will be developed by the Contractor and provided to Subcontractors that will reference more directly site safety requirements and provide the Emergency Action Plan, Site Requirements and General Requirements.
- B. All Subcontractors will be required to provide, to Contractor, a site specific safety plan for review and approval before any work is to begin on site. This plan must describe the means and methods that the Subcontractor will be using to safely perform all work on site, and comply with all federal, state and local safety requirements. This site specific plan will be provide to the Contractor for review and approval before any work activities are to begin onsite.
- C. Subcontractors must abide by the Messer Safety, Health and Environmental Requirements.
- D. As a component of the Messer Safety, Health and Environmental Requirements, all Subcontractors will provide all SDS sheets (safety data sheets) for any and all chemicals that will be used on site, to be stored at the project operations office in a predetermined place, to ensure access for all.
- E. Weekly Safety Meetings with all employees of this Subcontractor, documented by attendance sheets, typed safety topics (Tool Box Talks), a copy of the agenda, and minutes. This documentation is to be filed with Contractor on a weekly basis.
- F. Weekly Safety Walk-Through of the jobsite by each Subcontractor's Superintendent and Contractor's onsite personnel documented by a listing of deficient items found, methods of correction, and date of correction. This documentation is to be filed with Contractor on a weekly basis.

- 2.2 Any updates made to this binder are to be issued by addendum by the Subcontractor.
- 2.3 Subcontractors will also be required to fill out a job safety analysis for each work activity that they will perform. The formwork and process for filling this JSA out will be reviewed in this meeting.

PART 3 - NEW WORKER SAFETY ORIENTATION

- 3.1 All workers (craft, management, etc.) are required to attend a jobsite safety orientation prior to the start of work. This orientation will address safety, risk analysis, and infection control requirements on this project. It is anticipated that this orientation will take approximately one hour to complete.

PART 4 - PROJECT SPECIFIC REQUIREMENTS

- 4.1 Hard hats are required to be worn at all times.
- 4.2 Every Subcontractor, including lower tier subcontractors, shall provide, and require its employees to utilize, eye protection at all times on this project. This requirement applies to all employees at all times while on site except during scheduled breaks away from potential eye hazards or while in a trailer performing office functions.
- 4.3 Gloves are required for anyone entering or working on the jobsite. Every Subcontractor, including lower tier subcontractors, is required to provide appropriate hand protection for their employees with glove selection based on task hazards presented for work performed.
- 4.4 High-visibility vests or clothing is required at all times. In addition, any persons directing traffic along roadways are to have reflective signage to direct traffic in addition to the other PPE requirements.
- 4.5 100% fall protection at or above 6' for all personnel is required.
- 4.6 Guardrails are required on the perimeter all rooftops until final finish components need to be install at the perimeter. Warning lines will not be permitted.
- 4.7 Any barricade or safety device removed by a Subcontractor's employee(s) in order to perform the work shall be immediately re-erected as soon as that work activity is complete. Temporary barricades and controlled access zones must be established while

the barricade is down. If the Subcontractor does not perform this in a timely manner, Contractor or designee will perform and back charge the Subcontractor.

- 4.8 Use of platform style step ladders are required on this project. Regular step ladders will not be permitted.
- 4.9 100% tie-off is required while using all forms of lifts, including scissors lifts.
- 4.10 All Subcontractors performing any hot work (grinding, welding, burning, etc.) are required to provide a fire watch person. Fire blankets are also required where necessary.
- 4.11 All Subcontractors performing any overhead work will have approved plan to protect entire site from overhead hazards or falling objects before work is to begin.
- 4.12 Every Subcontractor, including lower tier subcontractors, will be required to conduct a “huddle” meeting prior to every work shift to discuss the activities of the shift and to establish a safe plan of action to accomplish the work. This meeting shall be conducted with all employees working on site by the onsite leader for each Subcontractor. It is to be an interactive meeting for all participants. Any potentially unsafe situations shall be assessed and dealt with prior to starting a particular activity. If the work intended to be performed changes over the course of the shift, it is the responsibility of the Subcontractor’s onsite leader to assure that the persons involved review and amend their safety plan accordingly before commencing the revised work. No activity shall proceed without a plan and the necessary equipment and processes to address any safety concerns.
- 4.13 Subcontractors will be required to address any site safety issues noted through Viewpoint within 24 hours after the issue has been noted.

PART 5 - MESSER SAFETY 4-SITE PROGRAM

- 5.1 Each Subcontractor and their lower tier subcontractors shall be subject to the Accountability Program as described herein. This Accountability Program provides for special attention to the OSHA Focus 4 Hazards (falls, electrical, struck by, caught in/between). For offenses (either actions or omissions) related to the OSHA Focus 4 Hazards, the following process shall apply:
 - A. First Violation by an Employee
 - 1. Upon notification by Messer of the violation, Subcontractor shall remove the employee or Messer shall remove its employee from the site for the remainder of that working day (and for the next working day also if removal occurs in the second half of the employee’s shift). If the employee is a supervisor or if Subcontractor’s

- supervisor is not readily available, Messer may direct the employee to leave the site and the incident shall be reported to Subcontractor's management.
2. Upon return, the Subcontractor (or Messer if a Messer employee is involved) shall give the employee a one-page handout on the Focus 4 Hazards. Employee must read, sign and date. Subcontractor must discuss the violation at the next huddle meeting.
- B. Second Violation by the same Employee
1. This section applies in the case of violation by an employee (of a Subcontractor or of Messer) of the same Focus 4 Hazard within one year, or a different Focus 4 hazard within three months; otherwise a subsequent violation by the same employee is treated as a first violation by that individual.
 2. A Subcontractor employee will not be permitted to work on any Messer project for one year. Prior to return to work on Messer projects, the Subcontractor must propose remediation/training for that employee and the training must be acceptable to Messer.
 3. A Messer employee will not be eligible for re-hire for 30 days and the completion of a 10-Hour OSHA training program.
- C. Second Violation for a Subcontractor
1. This section applies in case of a second violation by a Subcontractor's employees on this project (whether the same or different employees are involved in the two incidents).
 2. Subcontractor is required to provide a dedicated, competent safety person to the project to supervise the daily huddle meetings and the work of the Subcontractor, at no additional cost to the Owner or to Messer. This safety person must be on site whenever the Contractor is performing work on the project, until such time that Subcontractor has demonstrated to Messer's satisfaction that a significant improvement with the Subcontractor's safety performance has occurred.
- D. Multiple Violations
1. This section applies if Subcontractor fails to have a dedicated safety person on site at all times while its work is being performed after being cited for a Second Violation for a Subcontractor, or if a Subcontractor incurs a total of three or more covered violations on this and any other Messer projects collectively, during any 12-month period.
 2. If the Subcontractor has a direct contract with Messer, Messer may terminate those contracts for cause without further notice or opportunity to cure, and thereafter pursue all other available remedies for such default. If the Subcontractor does not have a direct contract with Messer, Messer may direct the Subcontractor under which the violating Subcontractor is working to remove the violating Subcontractor permanently from the project; in that event, the higher-tier Subcontractor has the responsibility of fulfilling the violating Subcontractor's work by other means at no additional cost to the Owner or Messer. If Messer elects not to terminate, Messer may impose other reasonable sanctions including fines and additional safety assurance requirements.
- E. Additional Terms
1. This Program is subject to change by Messer from time to time with notice to

- Subcontractor; however, Subcontractor is not required to accept material increases in its obligations or liability under the Program without its consent.
2. It is the intention of the Program to cover violations related to Focus 4 Hazards which are of a significant nature; however, it is NOT necessary to have an accident in order to find a violation. The attached summary outlines several examples of violations for each Focus 4 Hazard that are deemed to be covered; for any situation not listed on the attached summary, Messer's good faith determination as to whether it is a covered violation or not shall be final. Every identified violation will be reviewed by the supervisor of the site manager to ensure consistency of interpretation of a violation of the Focus Four Non-negotiables (see chart below).
 3. In Messer's discretion, a group of related individual violations may be treated as a single violation at the Subcontractor level. For example, if several Subcontractor employees engaged in related work are failing to use required fall protection, each such employee will be charged with an individual violation when the situation is discovered by Messer but if Subcontractor has no previous violations on this project, Messer may treat the incident as a single violation for Subcontractor and not impose Second Violation or Multiple Violation sanctions on Subcontractor.
 4. For purposes of Multiple Sanctions, "Messer projects" include all projects in which Subcontractor is a subcontractor or material supplier of any tier under Messer, and all projects in which Messer provides construction management services covering Subcontractor pursuant to an agreement with the Owner.
 5. It is not Messer's intention to interfere in Subcontractor's relationship with its employees. When feasible, significant actions under the Program such as excluding an employee from the project site will be notified by Messer to a supervisory employee of the Subcontractor for the Subcontractor to put into effect immediately, but Messer reserves the right to take immediate action to rectify unsafe situations, and to direct a Subcontractor employee to leave the site if Subcontractor management personnel are not on site. If Subcontractor is directed to remove an employee from the site, the disposition of the employee after leaving the site and any resulting compensation issues for the employee are solely between the Subcontractor and the employee, and the Program does not require that the Subcontractor withhold pay from the employee for the time that the employee is barred from the site, but there shall be no additional cost to the Owner or Messer for the Work as a result of exclusion of an employee or any other action taken pursuant to the Program.
 6. Messer and the Owner do not assume any responsibility whatsoever to Subcontractor, to its employees, or to third parties, for supervising or monitoring the safety precautions or compliance of the Subcontractor and its employees; Subcontractor remains solely responsible for these matters and shall defend and fully indemnify the Owner and Messer, as provided in the Subcontract Documents, against any claims or damages resulting from safety violations or other negligence of Subcontractor employees. Messer assumes no duty to anyone to detect and require correction of violations. Messer may, but is not required to, make periodic inspections of the project site. By establishing the Program and conducting other safety-related activities on the project, Messer is not undertaking any duty to Subcontractor, to Subcontractor's employees, or to third parties concerning safety on the project and any such duty is expressly disclaimed.
 7. Sanctions provided under the Program for individuals and the Subcontractor are

- not exclusive and Messer reserves all other remedies provided under the Subcontract Documents or by law.
8. The Owner and Messer shall have no liability whatsoever to any Subcontractor or Subcontractor's employee or any third party for actions taken by Messer pursuant to the Program in good faith, even if it is later determined that such action was factually or legally unjustified.
 9. A Subcontractor is not charged with a violation under the Program for any violation committed by an employee of a sub-subcontractor or material supplier to that Subcontractor, as long as the Subcontractor's supervisory personnel did not know about or condone the violation prior to the violation being observed by Messer. However, each Subcontractor must take all necessary actions to make the Program binding on its lower tiers and to cooperate with Messer in implementing any applicable sanctions against its lower tiers. Sub-subcontractors shall be entities with written agreements that include similar terms and conditions as those of Subcontractors with direct contracts with Messer. In the absence of such written agreements, Sub-subcontractor employees and representatives shall be treated as employees of the Subcontractor.

END OF SECTION 00 81 00



Messer Construction Company

Environmental, Health and Safety

Requirements

Revised 1/2018

Table of Contents

1.0	INTRODUCTION, PURPOSE AND SCOPE	3
1.1	CEO Statement.....	3
1.2	Purpose	3
1.3	Scope.....	3
2.0	GENERAL REQUIREMENTS.....	4
2.1	Safety & Health Program.....	4
2.2	Reporting	4
2.3	Potential Hazards and Emergencies.....	5
2.4	Employee Qualifications and Conduct	5
2.5	Safety Processes	7
2.6	Housekeeping and Sanitation	8
3.0	SAFETY REQUIREMENTS	8
3.1	Personal Protective Equipment.....	8
3.2	Elevated Work and Fall Protection	10
3.3	Scaffolding and Aerial Lifts.....	12
3.4	Ladders.....	13
3.5	Electrical Safety	14
3.6	Lockout, Isolation, and Tag out of Equipment.....	16
3.7	Tools.....	17
3.8	Confined Space Entry.....	18
3.9	Excavation and Trenching	19
3.10	Mobile/Heavy Equipment	20
3.11	Cranes and Rigging	21
3.12	Welding and Cutting.....	23
3.13	Lasers	24
3.14	Fire Protection and Prevention	24
3.15	Demolition	25
3.16	Use of Vehicles	26
3.17	Construction Signage Use.....	27
3.18	Concrete and Masonry	27

4.0	HEALTH REQUIREMENTS	28
4.1	Hazardous/Toxic Substances	28
4.2	Respiratory Protection	29
4.3	Medical Surveillance	29
4.4	Hearing Conservation and Noise Control	30
4.5	Asbestos Containing Materials	30
4.6	Lead Containing Materials	31
4.8	Industrial Hygiene and Exposure Standards	32
4.9	Moisture Intrusion and Mold	32
4.10	Hexavalent Chromium	32
5.0	ENVIRONMENTAL REQUIREMENTS	33
5.1	Protection of the Environment	33
5.2	Air Pollution	33
5.3	Water Pollution	33

1.0 INTRODUCTION, PURPOSE AND SCOPE

1.1 CEO Statement

Messer's safety goal is zero injuries on our projects.

Our core safety values are:

- We believe no job, task or schedule is more important than the health and safety of people on or near our jobsites
- We are responsible for and take action to ensure our own safety and the safety of those around us
- We will return every person home to their families safely each day

When our decisions and actions are guided by these core values, accidents will be nonexistent.

We are a company of builders who respect not only each other but our business partners. We have a strong passion to keep everyone safe and are committed to building a zero injury culture.

Creating and maintaining a culture of zero injuries takes every person working together to positively influence safety and health decisions, processes and policies. The continued growth of that safety culture will be greatly influenced by example. So, it is expected that Messer leaders, senior managers and our business partner's leadership model the safety behavior expected. However, it is imperative that all employees and workers on our sites make solid safety decisions, as well as hold all levels of management accountable for making safety a component of their leadership and supervision.

This commitment will keep our construction sites and all of our work environments accident free.

1.2 Purpose

The purpose of this Safety, Health and Environmental Requirements is to define minimum safety requirements for all Messer projects, Employees, Subcontractors, and other companies engaged in services on a Messer project. The requirements identify key points of Messer's Safety, Health and Environmental Management Plan to be undertaken during all construction activities.

These requirements are built upon Messer's philosophy that every incident is preventable. This forms the basis for our safety processes, procedures, and requirements that will be implemented on all Messer projects. The aim of this program is to provide personnel with the required information and knowledge to do the right things, the right way, every time to achieve our goal of Zero Injuries on our projects.

1.3 Scope

This plan applies to all personnel associated with any Messer project and any other location or task associated with a Messer project, including corporate headquarters and the Rental Division.

All Messer employees, sub-contractors and visitors shall comply with the requirements specified in this document as part of the contract conditions during execution of the service. Exceptions are only allowed upon approval by Messer via formal requests. If any conflicts are found the more stringent requirement shall apply. This document sets out the requirements to verify that safe work practices are established, appropriately supervised, with proper training and management so as to help prevent incidents such as personal injury, injury to others, environmental damage/impacts, or property damage.

2.0 GENERAL REQUIREMENTS

2.1 Safety & Health Program

- 2.1.1 Each contractor (and supplier when applicable) shall submit a copy of its site-specific safety program to Messer before its work begins. This plan must include the criteria and topics outlined in the Messer Subcontractor Site-Specific Safety Plan template. The contractor/supplier shall ensure that their plan meets or exceeds the safety requirements for the project.
- 2.1.2 The contractor/supplier is required to submit its fall protection plan (if applicable), any applicable training certification such as crane operator training, and any other site-specific paperwork associated with the project, before work begins.
- 2.1.3 Prior to beginning work onsite, the site-specific safety plan and associated documentation must be reviewed and discussed with Messer project management and/or safety personnel in a Pre-Construction Safety Meeting.
- 2.1.4 Each contractor/supplier shall maintain an effective Company safety and health program, which will provide systematic policies, procedures and practices that are adequate to identify and protect their employees from occupational safety and health hazards. The contractor/supplier safety and health program shall, at a minimum, include:
 - 2.1.4.1 Management commitment and employee involvement;
 - 2.1.4.2 Documented work site analysis and hazard assessment;
 - 2.1.4.3 Hazard prevention and control procedures; and
 - 2.1.4.4 Safety and health training.

2.2 Reporting

- 2.2.1 The contractor/supplier shall notify the Messer representative immediately in the event of an injury, first aid case, near miss, property damage, or environmental incident, such as a spill or release of hazardous material.
- 2.2.2 The contractor/supplier shall submit a completed Messer accident/incident report to the Messer representative within 24 hours of the occurrence of the injury, incident, etc.
 - 2.2.2.1 The report shall include, as a minimum, the nature and extent of the injury, first aid case, near miss or incident, causes of the injury etc., and corrective actions needed to prevent a recurrence.
 - 2.2.2.2 Any follow-up information on personal injuries (doctor's reports, insurance or worker's compensation reports etc.) shall be forwarded to the Messer representative as soon as it becomes available.
- 2.2.3 As required by federal, state, or local laws or ordinances, the contractor/supplier shall report certain injuries, illnesses, or environmental incidents to the appropriate agencies.

The contractor/supplier shall be knowledgeable of these reporting requirements, and shall inform and copy Messer when any such report is necessary or is made.

2.3 Potential Hazards and Emergencies

- 2.3.1** The contractor/supplier shall inform its employees of potential hazards, take appropriate steps to reduce exposure to potential hazards, and be prepared to respond to emergency situations.
- 2.3.2** The contractor/supplier shall provide emergency response procedures for the job site, and shall communicate such procedures to its employees. Emergency response procedures shall include the identification of any emergency alarms and warning systems, a list of emergency phone numbers, identification of emergency evacuation assembly areas, placement and use of emergency equipment and procedures for notification of local authorities, agencies, and the Messer representative.
- 2.3.3** Each contractor/supplier shall have at least one certified person trained in first aid and CPR available on site. The contractor/supplier shall have readily available the names and locations of off-site medical personnel to handle major occurrences. Adequate first aid and emergency medical equipment shall be provided as necessary. The name(s), contact number(s) and copies of the first aid & CPR cards must be submitted upon request.
- 2.3.4** The contractor/supplier shall obtain Safety Data Sheets (SDS) and other appropriate information, and shall inform its employees and Messer of any potentially hazardous materials they may be exposed to while in performance of the work. At the contractor's/supplier's request, Messer shall provide this information for products or materials that are supplied by Messer or are under the control of Messer.
- 2.3.5** The contractor/supplier shall immediately rectify any situation or condition occurring as a result of the work, that could result in injury or illness to personnel at the site, or that could cause an environmental hazard. If such a condition cannot be corrected immediately, the contractor/supplier shall provide temporary barricades and appropriate warning signs and devices necessary for the protection of people, equipment, and property.

2.4 Employee Qualifications and Conduct

- 2.4.1** The contractor/supplier shall employ or cause to be employed only persons who are fit, qualified, and skilled in the work to be performed. They shall also ensure that employees receive and successfully complete the necessary safety training, and are capable of performing work activities in a safe manner. Documentation of such training shall be available upon request. Additional training may be required when individuals are considered competent personnel on the job site. It is the responsibility of the employer to ensure that these individuals receive this training.
- 2.4.2** Contractor/supplier personnel shall confine their activities to the assigned work areas.
- 2.4.3** Contractor/supplier personnel shall use only facilities designated by Messer for non-work activities such as smoking, eating, or using the restroom.

- 2.4.4 Prior to commencing work, the contractor/supplier shall designate a competent person or persons who is capable of identifying existing and potential hazards in the surroundings or working conditions and have the authority to correct any deficiencies. Upon request, the contractor shall provide documented training identifying why this person has been deemed competent. The competent person must be on the job site at all times. The Messer representative must be notified of any changes in the competent person status.
- 2.4.5 If employees are not proficient in English, the Contractor must, at all times provide an interpreter to effectively communicate safety requirements including, but not limited to verbal commands, written notices, signage, alarms and loudspeaker announcements. The interpreter, when necessary, shall ensure that employees understand rules, regulations, and procedures issued by Messer for the jobsite. If it is determined that any Contractor employees are in violation of these requirements, Contractor and its employees may be removed from the jobsite.
- 2.4.6 The contractor/supplier shall ensure that no firearms, weapons, controlled or illegal substances, or alcoholic beverages are brought onto the job site by contractor employees, except as specifically authorized by the Messer representative.
- 2.4.7 No contractor/supplier employee shall report to work or shall work impaired by any substance, drug, or alcohol, lawful or unlawful. "Impaired" means under the influence of a substance such that the employee's motor senses (i.e., sight, hearing, balance, reaction, reflex), or judgment either are or may be reasonably assumed to be affected. Any violation of this policy may result in removal from the job site.
- 2.4.8 Contractor/supplier employees taking prescription medication that warns against driving or operating machinery shall inform their foremen or safety representative of such.
- 2.4.9 When vehicles of contractor/supplier employees are on the client's premises or any area associated with the job site, the contractor/supplier shall enforce the rules for safe vehicle operation. Drivers shall obey all signs and posted speed limits. Drivers and passengers in vehicles shall wear seat belts.
- 2.4.10 Threatening, intimidating, coercive, or other unsafe or disruptive behavior such as fighting and horseplay is prohibited.
- 2.4.11 Sleeping and gambling on Messer job sites are prohibited.
- 2.4.12 Contractor/Supplier employees shall confine their activities to areas expressly authorized to them for such use. Activities include: entering the work site premises, parking vehicles, taking breaks, eating, drinking, smoking, and using lavatory facilities. Under no circumstances shall contractor/supplier personnel be allowed to enter, walk through, or loiter in occupied areas or other areas not authorized for their use or entry.

2.5 Safety Processes

- 2.5.1 The contractor/supplier shall not permit visitors on the job site unless they have checked in at the Messer project office and have been given express permission to be present. They are to be accompanied at all times by an authorized contractor/supplier representative.
- 2.5.2 The contractor/supplier shall orient all authorized visitors to the job site concerning safety rules and site hazards. Requirements associated with personal protective equipment and all rules of conduct shall pertain to all visitors.
- 2.5.3 Site safety inspections shall be conducted by the Messer representative on a regular basis and deficiencies will be logged in Latista. Immediate on-the-spot corrections of safety deficiencies shall be performed as necessary. The contractor shall be responsible for conducting their own daily safety inspections of its work activities.
- 2.5.4 The contractor/supplier shall complete a documented Job Safety Analysis (JSA) for each activity. The JSA's shall be submitted to Messer as required.
- 2.5.5 Each contractor shall conduct a huddle meeting prior to every work shift to discuss the activities of the shift, review JSA(s) and to establish a safe plan of action to accomplish the work. This meeting shall be conducted with all employees working on site by the on-site leader for each contractor. Any changes to the established plan shall be communicated throughout the shift to affected employees.
- 2.5.6 The contractor/supplier (if on site more than sporadically) shall conduct weekly "tool box" safety meetings with its personnel. The topics for the meeting shall be relevant to the work activity and/or job site conditions. It shall provide copies of all such documentation to the Messer representative immediately after the meeting. Everyone on site must attend any scheduled project-wide safety meetings.
- 2.5.7 The contractor/supplier shall attend a scheduled Pre-Construction Safety Meeting before the contractor's/supplier's work begins on the job site. Messer reserves the right to require sub-tier contractors/suppliers to participate in this orientation activity. This program will review all anticipated and existing hazards that are associated with or will affect the contractor's/supplier's employees. At this time, the contractor/supplier shall inform the Messer representative of its competent person(s). The meeting shall also include a review of safety protocol and requirements for the project.
- 2.5.8 The contractor/supplier shall contact the Messer representative immediately when an OSHA compliance officer arrives at the job site. The contractor/supplier shall inform the Messer representative of any employee complaint, incident, etc. that results in or may result in an OSHA inspection.

- 2.5.9 The contractor/supplier and its employees shall direct all public media inquiries to the Messer representative. At no time shall the contractor/supplier or its sub-tier contractors/suppliers allow or permit media to enter the job site without expressed authorization from the Messer representative.

2.6 Housekeeping and Sanitation

- 2.6.1 Any round/tubular materials shall be chocked or otherwise secured as necessary to prevent rolling. Stacked material shall be stable and secured from tipping.
- 2.6.2 Food/lunch debris shall be discarded into trash receptacles only. No food debris shall be located in any part of a building not designated as a break area. Receptacles containing food debris shall be removed from the site on regular intervals.
- 2.6.3 Urination or defecation anywhere on site other than the designated chemical toilets is grounds for immediate removal from the project.
- 2.6.4 Contractors must provide daily clean-up of their designated work areas. This shall include maintaining an orderly arrangement of operations, tools, equipment, storage facilities, and supplies during the entire course of the project. If daily housekeeping is not maintained, work can be stopped until the area is deemed clean and safe to proceed by Messer management.

3.0 SAFETY REQUIREMENTS

3.1 Personal Protective Equipment

- 3.1.1 Hardhats meeting American National Standards Institute (ANSI) Z89.1 specifications shall be worn at all times by all personnel at the work site. Hard hats shall be worn with the brim facing forward, unless a welding shield (or other device, which prevents such) is in use. This requirement specifically includes all work completed during the finish stages of the project.
- 3.1.2 Safety glasses (including safety prescription eyewear) with attached side shields meeting the American National Standards Institute (ANSI) Standard Z87.1, latest issue, shall be worn at all times on Messer projects through the finish stages. The only exceptions will be during scheduled breaks away from potential eye hazards, while in a trailer performing office functions or in a fully enclosed cab of a truck/equipment.
- 3.1.2.1 Appropriate shaded/filter lenses shall be required to protect against radiant energy such as during welding. Suitable laser safety glasses shall be used as required, to protect against the specific wavelength of the laser and be of optical density adequate for the energy being used.
- 3.1.2.2 Tinted safety glasses are not permitted for general use indoors.
- 3.1.2.3 Safety goggles and/or tight fitting safety glasses should be worn for work activities where hazards dictate (e.g. dusty environments, overhead demolition work, etc.)

- 3.1.3** Face protection is required in addition to safety glasses when potential exposure exists to particulate matter generated by hammering; chipping; welding; grinding; cutting; heating; burning; insulation handling; or where there is possible exposure to hazardous chemicals. Examples include, but are not limited to:
- 3.1.3.1 Any time one is cutting or grinding with an abrasive wheel. This includes, but is not limited to target saws, chop saws, angle grinders, etc.
 - 3.1.3.2 When pouring concrete; the workers located at the hopper, operating the hose and using the vibrator.
- 3.1.4** When handling acids, caustics, and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.
- 3.1.5** Personnel shall wear personal clothing and footwear that is safe and proper for the work and any job site exposures. At a minimum, full-length trousers and shirts with a minimum 4-inch sleeve are required.
- 3.1.6** High visibility clothing (shirt, vest, or jacket) shall be worn at all times on the project and must be the outer-most garment. Acceptable colors include fluorescent yellow/green and fluorescent orange/red. Messer will provide notification if and/or when this requirement does not apply to a particular project.
- 3.1.7** High-visibility clothing with retro-reflective striping shall be utilized when working in or around roadways and if lighting conditions are poor. Clothing must meet the ANSI Class applicable to the work being performed.
- 3.1.8** Work boots (covering over the ankle) are required for all contractor personnel on site. They are also required for suppliers when they are exposed to hazards affecting the feet. Tennis shoes or work shoes are not acceptable, regardless of steel/composite toe or other safety ratings. Contractor/supplier personnel shall wear boots that are commensurate with the hazards of the work and the work site area. This includes rubber boots when working in or near damaging liquids or concrete, safety-toe boots when moving or rigging heavy objects and metatarsal protection when jackhammering or tamping activities.
- 3.1.9** 100% hand protection is required on all Messer projects. Gloves shall be worn by all personnel on the project site at all times, including supervisory personnel. Gloves must be task appropriate and meet ANSI/ISEA 105-2016 American National Standard for Hand Protection Classification.
- 3.1.9.1 If hand protection is considered infeasible or creates a greater hazard for a particular task, a written safe plan of action outlining the reason for the variance must be approved through Messer prior to beginning the activity.
- 3.1.10** Cut resistant sleeves shall be worn during demolition activities where puncture, laceration and/or burn hazards to the arms are present.

- 3.1.11 The contractor/supplier shall familiarize itself with and comply with more rigorous personal protective equipment standards as required on specific projects.

3.2 Elevated Work and Fall Protection

- 3.2.1 100% fall protection is required on Messer job sites, for activities, which involve work at elevations of 6 feet or higher. 100% fall protection is also required at lower heights if the individuals are working above dangerous equipment. 100% fall protection is required for all crafts, trades, including steel erection and activities associated with these types of elevations. The use of ladders and the construction of scaffolding may not be applicable in section 3.2, and are addressed in section 3.3 and 3.4 in this program.
- 3.2.2 Prior to the start of work, contractor/supplier representatives involved with elevated work shall meet with Messer representatives to review the scope of work, especially as it pertains to fall protection requirements and needs. As part of the Contractor Pre-Construction Safety Meeting, an evaluation should be made of the possible fall hazards and effective safety responses to such.
- 3.2.3 The following conventional fall protection systems shall be the preferred choice for elevated work activities:
- 3.2.3.1 Guardrail systems
 - 3.2.3.1.1 Cable guardrail systems shall be a minimum 3/8" cable and shall be equipped with turnbuckles for tightening where necessary.
 - 3.2.3.2 Safety net systems
 - 3.2.3.3 Personal fall arrest systems
- 3.2.4 Open vertical studs/faming shall not be considered adequate fall protection at exterior walls or interior openings. Where openings between vertical members are less than 18" wide, a top rail and toe board, at a minimum, must be installed. Where openings are 18" wide or greater, a full guardrail system (top-rail, mid-rail, and toe board) must be in place. Guardrail systems shall remain in place until wall sheeting and/or windows are installed to provide equivalent protection.
- 3.2.5 A recognized manufacturer of fall protection equipment, such as Miller, DBI/SALA, MSA, etc., may manufacture a horizontal lifeline system. Alternately, a qualified person may design a horizontal lifeline system. A qualified person is defined as; one who has the technical capability to determine applied loads during a fall event and calculate the resultant forces on the system, as well as calculate the resultant elongation in the system due to the forces encountered during a fall event. In either case, the system must be installed by a competent person, and used by trained individuals according to the manufacturer or designer's instructions.
- 3.2.5.1 Horizontal systems must be attached to a fixed anchorage and may not be linked together.

- 3.2.6** If the contractor/supplier can prove that more common fall protection is infeasible or creates a greater hazard, as defined in Subpart M of the OSHA Construction Standards, it may, where permitted by a Messer Safety Representative, implement the following non-conventional systems in response to the fall hazards:
 - 3.2.6.1** Warning lines;
 - 3.2.6.1.1** Required to be a minimum of 15 feet back from leading edges for all trades, excluding roofers.
 - 3.2.6.2** Controlled access zones.
 - 3.2.6.3** Safety monitoring systems will not be permitted.
- 3.2.7** Non-conventional systems may be utilized in controlled work environments provided the following is established:
 - 3.2.7.1** Explanation in writing is submitted to the Messer Safety Department as to why the use of one of the three conventional fall protection systems is infeasible or creates a greater hazard/harm to the individuals involved.
 - 3.2.7.2** Development of a written fall protection plan, which outlines all elements involved with the usage of warning lines, controlled access zones, or safety monitoring systems; and
 - 3.2.7.3** Orientation process, which communicates this information to the individuals involved with the work activity, prior to beginning work.
- 3.2.8** The purpose of this extensive pre-planning is to ensure that the most effective and appropriate fall protection systems are used whenever possible. It is also designed to ensure that those individuals involved with the usage of warning lines and controlled access zones truly understand the detail and organization required. Finally, the pre-planning will also highlight who is permitted (due in part to thorough training and communication) to work with these systems.
- 3.2.9** The procedures developed in response to the identified fall hazards shall be reviewed with all individuals exposed to the hazards. Feedback should be encouraged so as to ensure that the most effective systems are utilized.
- 3.2.10** Contractors/suppliers shall be responsible for ensuring that their employees using fall protection systems have been adequately trained. Communication on the following shall be included in the training:
 - 3.2.10.1** Fall hazards associated with the elevated work;
 - 3.2.10.2** Elements of the fall protection systems utilized;
 - 3.2.10.3** Fall protection equipment used;
 - 3.2.10.4** Elements of a fall protection plan, if applicable; and
 - 3.2.10.5** Proper inspection techniques of fall protection equipment.

- 3.2.11 An inspection process of fall protection systems shall be established. Individuals shall visually inspect the fall protection equipment before each use. Some equipment requires documented inspections by its manufacturer on a routine basis. This equipment shall have evidence of the inspection and re-certification process on it. This information shall be reviewed before the equipment is used.
- 3.2.12 Any fall protection equipment that is defective, damaged, or has been subjected to an impact shall be identified and removed from service immediately.
- 3.2.13 The contractor/supplier retains all responsibility for the effective implementation of fall protection programs as well as all other safety programs, regardless of any review by Messer.

3.3 Scaffolding and Aerial Lifts

- 3.3.1 Each part of supported scaffolding shall be capable of supporting at least 4 times its intended load. All work platforms shall be fully decked between guardrails. All scaffold planks shall be overlapped to a minimum of 12 inches or secured as with cleats to prevent movement.
- 3.3.2 Footings shall be sound and rigid. Concrete blocks, bricks, barrels or similar items shall not be used for supports. Supported scaffold poles, legs, posts, frames, and uprights shall bear on base plates. Base plates shall bear on mudsills or other adequate firm foundation.
- 3.3.3 Supported scaffold towers with a height-to-base width ratio greater than 4:1 shall be restrained from tipping by tying, guying or other equivalent bracing. Ties shall be rigid and designed to prevent the scaffold system from tipping into or away from the structure. Supported scaffold more than 3 feet wide shall be secured against displacement every 26 feet vertically and every 30 feet horizontally.
- 3.3.4 All manufacturers' bracings, couplings, or stacking and vertical locking pins shall be installed.
- 3.3.5 Guardrails and toe boards must be provided on all sides and ends of scaffolds 6 feet or more in height. Open-sided ends shall be guarded.
- 3.3.6 If the scaffold platform is less than 45 inches wide, as with Perry and Baker type utility scaffolds, guardrails shall be installed at heights of 4 feet or higher. Additionally, these scaffold systems shall have appropriately installed outriggers or otherwise be restrained from tipping if the working platform is at a height-to-base width ratio greater than 3:1.
- 3.3.7 Scaffolds shall be provided with an access ladder or another equally safe access method. Vertical ladders or ladder frames shall not be used where the total length of a climb equals or exceeds 24 feet, unless an approved fall protection device is installed and used while climbing.
- 3.3.8 Rolling scaffolds shall have their wheels locked when in use. No scaffold shall be moved while occupied, or while tools or equipment is on it.

- 3.3.9 Contractors/suppliers must have a competent person involved with the erection, dismantling, and inspection of scaffolding. Anyone erecting or dismantling scaffolding must be trained and be able to provide proof of training.
- 3.3.10 The contractor/supplier shall inspect all elevated work platforms each day. Inspections shall be documented on an inspection log or through a tagging system. Scaffolding that is incomplete or unsuitable for use shall be tagged as such at or near the access point. Defects shall be corrected prior to use.
- 3.3.11 Appropriate protection shall be provided for individuals working in the area of scaffolding, or for those who are exposed to overhead hazards while working on scaffolding.
- 3.3.12 Notwithstanding the specific requirements listed herein, all scaffolds and scaffold installation processes must meet or exceed all manufacturers' requirements.
- 3.3.13 Contractor/supplier shall have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard.
- 3.3.14 Aerial work platforms shall be inspected and controls tested daily to verify that the equipment and all its components are in a safe operating condition. Do not operate any aerial lift if any components are defective until it is repaired by a qualified person.
- 3.3.15 Only properly trained and authorized persons shall operate an aerial lift.
- 3.3.16 All aerial work platforms, including scissors lifts, require the use of a full body harnesses and appropriate lanyard or retractable in any elevated position.
- 3.3.17 Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.
- 3.3.18 Work areas and travel paths shall be inspected to ensure that any hazards that may cause the aerial lift to become unstable or roll over are eliminated.

3.4 Ladders

- 3.4.1 All contractors/suppliers shall use ladders which are Type 1 or better; approved for industrial usage.
- 3.4.2 Metal stepladders and step stools are prohibited. Metal straight ladders and extension ladders must not be used where possible exposure to electrical hazards exists.

- 3.4.3 Job-made ladders shall be built for their intended use. Double cleats shall be used if more than 25 workers are using the ladder, or 2-way traffic is expected.
 - 3.4.3.1 Single cleat ladders shall not be more than 30 feet between the base and the top landing; double cleat ladders shall not be more than 24 feet.
- 3.4.4 Ladders shall not be used as platforms or scaffold planks.
- 3.4.5 Ladders shall be kept free of grease and oil. Personnel going up or down shall face toward the ladder and grip the side rails with both hands. Tools or other objects shall be hoisted up as necessary, or carried in a tool pouch and not carried by hand up or down the ladder.
- 3.4.6 Extension and straight ladders must be set at an angle of 1 foot horizontal for every 4 feet of working ladder length.
Extension and straight ladders shall be tied off at the top and/or bottom when in use. Until secured, a second person shall be used to keep the ladder from slipping. Only one person shall be allowed on a ladder at a time.
- 3.4.7 Ladders shall not block doorways, passages, high traffic areas, etc. unless the area is barricaded. Warning signs shall be posted, or a spotter shall be involved.
- 3.4.8 Platform type stepladders shall be used in lieu of traditional stepladders. They must be fully open with spreaders locked when in use. Traditional stepladders shall not to be used.
- 3.4.9 Damaged ladders shall be taken out of service. Ladders shall not be painted, except for stenciling for identification purposes. Ladders shall be inspected daily prior to use.

3.5 Electrical Safety

- 3.5.1 All electrical equipment, including main feeder lines, branch circuits, and grounding systems shall be installed in accordance with the National Electrical Code as a minimum requirement.
- 3.5.2 A minimum of 3 feet of clearance shall be maintained around energized electrical parts.
- 3.5.3 Cabinets, boxes, fittings, or other forms of enclosures shall be used when energized parts of 50 volts or greater are exposed. Entrances to rooms containing energized electrical parts shall be marked with warning signs and access shall be controlled by the exposing contractor. Covers shall be approved. Cardboard and magnetic covers are not approved as temporary covers. All electrical equipment shall be labeled in accordance with the requirements of NFPA 70e.
- 3.5.4 The metal parts of portable and/or plug connected equipment shall be protected through 3 wire cords and plugs or shall be double insulated.

- 3.5.5 All power tools and equipment connected by cord and plug, and all extension cords must be visually inspected. GFCI devices must be inspected and tested prior to each use.
- 3.5.6 Extension cords must be of the three-wire grounded type S, SE, SO, ST and rated for hard service and a minimum 14 gauge in size. No flat cords are allowed. Cords shall not be spliced or taped. Damaged cords shall be removed from service and tagged as defective, or rendered unusable by removing the male plug end. All cords should be checked for proper polarity.
- 3.5.7 Cords shall be protected from traffic, sharp edges and corners. Extension cords and cables passing through high traffic areas shall be elevated or covered for protection. Extension cords shall not be fastened with staples, hung from nails or suspended with wire. Extension cords shall be arranged to eliminate any tripping hazards.
- 3.5.8 All electrically powered equipment, including motors, transformers, generators, welders, and other machinery, shall be properly grounded, and insulated.
- 3.5.9 All 120 volt, single phase, 15 and 20 amp receptacle outlets on construction sites, which are not part of the permanent wiring (otherwise known as temporary power circuits) shall have GFCI protection. GFCI protection is required when extension cords, cord sets, power tools, equipment, etc. are connected to permanent wiring during the construction project.
- 3.5.10 Secondary external GFCI protection (pigtailed) are required on all generator power including, welding machines, mobile light towers, etc. This is in addition to any GFCI protection built into the outlet.
- 3.5.11 Electrical equipment shall be periodically inspected and repaired as necessary. The electrical contractor shall inspect the temporary power, including the GFCI devices and lights, on a weekly basis. All temporary power receptacles shall be numbered and labeled to confirm a weekly inspection has been completed.. Results of these inspections will be documented, and provided to Site Management.
- 3.5.12 Work on live or energized systems is generally not permitted. If such work is unavoidable, an energized work plan in compliance with NFPA 70e must be developed, reviewed and accepted by Messer prior to commencement of work.
- 3.5.13 When energized parts are exposed barriers, ,guards and signage shall be used to prevent the area involved in electrical work from becoming an access point.
- 3.5.14 All contractor/supplier personnel trained and authorized to work on, or around energized electrical systems shall be required to have all required PPE and arc flash protection required by NFPA 70e.

- 3.5.15 Construction/temporary lighting shall meet NEC and OSHA requirements as well as maintaining a minimum of 5-foot candles and/or more where the standards require it. Each room shall have at least one active temporary lamp until such times that the permanent lighting systems are activated.
- 3.5.16 Temporary lighting bulbs shall be protected from breakage. Metal case sockets shall be grounded. Do not suspend temporary lights by their electrical cords unless it has been designed for this use. GFCI protection is required when lighting is located in wet or conductive locations. Temporary lighting must be on a dedicated circuit.
- 3.5.17 Temporary task lighting shall be mounted to a stand or secured to a base. Temporary task lighting shall meet all other applicable standards associated with temporary lighting as indicated in NEC and OSHA.

3.6 Lockout, Isolation, and Tag out of Equipment

- 3.6.1 Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or materials prior to the start of work. Such equipment shall be secured where possible by locking and tagging methods.
- 3.6.2 Where equipment is subject to unexpected movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement.
- 3.6.3 The use of tags without locks shall be permitted only when the use of locks is physically impossible. Strict controls and supplemental protective measures such as physical separation, blocking, removing fuses, or positioning an attendant by the tagged equipment shall also be utilized.
- 3.6.4 Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock. All such locks shall be individually keyed with the key(s) in the control of the authorized individual. The use of a master key to open any safety locks is prohibited.
- 3.6.5 Where more than one person is assigned to work on a piece of equipment or system, each person shall be responsible for applying their own individually keyed lock to each lockout device. When this is not possible, a group/complex lockout/tag out procedure is acceptable, provided that a plan is developed and communicated to the Messer representative before lockout takes place.

- 3.6.6 Controls that must be de-energized during the course of work shall be locked and tagged accordingly. De-energized equipment and circuits shall be rendered inoperative, and tagged at points where the equipment can be energized. The contractor/supplier shall provide a written lockout/tag out program.

3.7 Tools

- 3.7.1 All tools shall be used in accordance with the manufacturer requirements and recommendations. Guards must remain in place and operational at all times.

3.7.2 General/Hand Tools

- 3.7.2.1 Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.
- 3.7.2.2 Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- 3.7.2.3 Personal protective equipment shall be in accordance with section 3.1 of these requirements and manufacturer recommendations.
- 3.7.2.4 All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.

3.7.3 Electric Tools

- 3.7.3.1 Electric power operated tools shall either be double-insulated type or grounded.
- 3.7.3.2 The use of electric cords for hoisting or lowering tools shall not be permitted.

3.7.4 Pneumatic Tools

- 3.7.4.1 Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
- 3.7.4.2 Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
- 3.7.4.3 All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 psi pressure at the tool, shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

3.7.5 Powder Actuated Tools

- 3.7.5.1 Only employees who have proof of training, in the operation of the particular tool in use shall be allowed to operate a powder-actuated tool.
- 3.7.5.2 The tool shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.
- 3.7.5.3 Warning signs shall be posted at access points to areas where powder-actuated tools are being used. This signage shall include at minimum "CAUTION POWDER-ACTUATED TOOL IN USE".
- 3.7.5.4 Loaded tools shall not be left unattended.

- 3.7.5.5 Storage of powder cartridges and disposal of expended or unexpended cartridges shall comply with the manufacturer's recommendations.

3.8 Confined Space Entry

- 3.8.1 All confined space activities must be reviewed with the project management team prior to commencement of the related work activities. Confined space entry permits are required as part of the entry process.
- 3.8.2 Confined spaces, including tanks, manholes, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilation ducts, or other enclosures where known or potential hazards may exist, shall not be entered without strictly adhering to a confined space entry policy, which meets the requirements of 29 CFR 1926 Subpart AA.
- 3.8.3 Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any unauthorized individuals, hazardous substances, or materials, which threaten the safety of the entrants and the stability of the space. All energy sources, including stored or residual energy, shall be isolated and/or blanked, and locked out.
- 3.8.4 The atmosphere shall be tested before entry and monitored to determine if it is safe. Acceptable limits are:
 - 3.8.4.1 Oxygen: 19.5% lower – 23.5% upper;
 - 3.8.4.2 Flammable Gas: Not to exceed 10% of Lower Flammable Limit (LFL);
 - 3.8.4.3 Toxic Contaminants: Not to exceed the Permissible Exposure Level (PEL).
 - 3.8.4.4 Airborne Combustible Dust: Not to exceed its Lower Flammable Limit (LFL)
- 3.8.5 Continuous atmospheric monitoring shall take place throughout the entry. Monitoring results shall be documented on the entry permit, with the initials of the individual conducting the testing.
- 3.8.6 Contractors/suppliers shall complete a confined space entry permit before permitting workers to enter the space. This document shall be reviewed and approved via a signature by the entry supervisor. The contents of the completed permit shall be reviewed with the entrants before entering the space.
- 3.8.7 The confined space shall have an attendant monitoring the activities within the space. This individual shall be in constant communication with the entrants inside the space. At all times, the attendant shall know who is inside the space. The attendant shall not have any other responsibilities than monitoring the space. He/she may not enter the space to perform rescue unless relieved of his/her duties as an attendant.
- 3.8.8 Adequate ventilation shall be provided to establish and maintain a stable atmospheric environment. Ventilation systems shall be designed for use in confined spaces.
- 3.8.9 Non-entry rescue systems shall be designed for the retrieval of humans, and shall not be used for equipment purposes. Entrants inside the space shall wear full body harnesses, and shall be connected to the retrieval system.

- 3.8.10 Rescue procedures for all confined spaces shall be established prior to entry. If a space is classified as permit-required, contractors/suppliers shall ensure proper rescue provisions are provided, including a trained entry/rescue team when required.
- 3.8.11 All individuals involved in confined space activities shall have extensive training, including hands-on experience with the safety equipment involved. Documentation of required training shall be submitted to Messer prior to the start of any confined space work activities.
- 3.8.12 Once the confined space work has been completed, the entry permit shall be cancelled. A copy of the cancelled permit shall be given to the Messer representative.

3.9 Excavation and Trenching

- 3.9.1 Excavating shall not be performed until the location of underground utilities or other installations that reasonably may be expected to be encountered are determined. Utility marking services, owner representatives, and reference drawings, which have been prepared and identified for the specific job, shall be used to review and/or identify any potential hazards. Hydro-excavation, potholing and/or hand digging shall be used within tolerance zones and to confirm locations of existing utilities to be crossed.
- 3.9.2 A competent person shall perform daily documented inspections of excavations and shall be responsible for soil classification. All excavation documents shall be maintained on site and shall be available for review by Messer. Inspections shall occur before the work begins, and as needed throughout the shift. Inspections shall also occur after rain, snow, thaw or other hazardous conditions affect the excavation. If evidence of a hazardous condition is apparent, all work in the excavation shall cease until necessary corrections have been made by the competent person.
- 3.9.3 Benching, sloping, shielding or shoring shall be used in all excavations 5 feet or more in depth except when excavating in stable rock. Shoring of excavations less than 5 feet deep may be required if examination by a competent person reveals ground movement or evidence of a possible cave in.
- 3.9.4 Excavations below the footings of foundations, retaining walls, or structures themselves shall not be permitted, except in stable rock or if the wall is underpinned and steps have been taken to ensure stability of the structure. Support systems shall be planned and designed by a qualified person – usually a professional engineer.
- 3.9.5 If forms or other structures are installed or constructed in an excavation so as to reduce the dimension (measured from the forms/structure to the sides of the excavation) to 15 feet or less (measured at the bottom of the excavation), a trench inside of an excavation has been created. This may affect the access and egress associated with the excavation, as well as with the trench.
- 3.9.6 Water shall not be permitted to accumulate in an occupied excavation. Existing or flowing water shall be removed prior to and during entry into the excavation.

- 3.9.7 Support systems shall be planned and designed by a qualified person (generally a professional engineer) when the excavation is in excess of 20 feet deep, adjacent to structures, or subject to water or vibration. All shoring systems shall be designed by a qualified person, or built in accordance with OSHA Subpart P.
- 3.9.8 Excavations 4 feet or more in depth and occupied by personnel shall be provided with ladders or other effective means of exit. In trenches, these access points must be located within 25 feet of the area in which the individuals are working.
- 3.9.9 Adequate barrier protection for excavations shall be provided when not readily visible or when located adjacent to vehicular or foot traffic. Barriers or warning systems shall be easily visible, day or night. Barriers/warning systems must be located at least 6 feet from the edge of the excavation.
- 3.9.10 When an atmospheric condition may exist and/or develop in an excavation, atmospheric monitoring of the excavation shall take place before and during entry. Ventilation shall be provided when the monitoring indicates the necessity of such.
- 3.9.11 Excavated earth or other materials shall be placed at least 2 feet from the edge of the excavation.
- 3.9.12 At no time shall equipment (not directly associated with the excavation work) be operated within 2 feet of any excavation. If it is necessary to operate heavy equipment on a level above and near an excavation, the sides of the excavation shall be sheet-piled, shored, and braced as necessary to resist additional pressure. Barricades or stop logs shall be used around an excavation when mobile equipment is used near an excavation.
- 3.9.13 Backfilling and removal of trench supports shall progress from the bottom of the trench. Ropes shall be used to pull out the jacks after all workers have cleared the trench.
- 3.9.14 Caisson entry shall be performed in accordance with Associated Drilled Shaft Contractors' (ADSC) Recommended Procedures for Entry of Drilled Shaft Foundation Excavations. Where access and egress is restricted and/or atmospheric conditions could be expected to present a hazard, this work activity should be performed following the permit-required confined space process.

3.10 Mobile/Heavy Equipment

- 3.10.1 The design capacity of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original safety or capacity factor.
- 3.10.2 Mobile equipment shall be fitted with suitable alarms and motion sensing devices. If no backup alarm is present, a designated spotter shall be provided whenever the equipment is backing.

- 3.10.3** A safety observer shall be assigned to watch the movement of heavy mobile equipment where such movement may cause a hazard to other personnel, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept out of the way or path of suspended loads, and clear of the mobile equipment.
- 3.10.4** Equipment shall be inspected by the contractor/supplier using and/or controlling such equipment prior to its use on the job, and periodically thereafter to ensure that it is in safe working order. Defective equipment shall be removed from service immediately, and a warning tag attached. Equipment with exposed gears, belts, couplings, etc. must be provided with proper guards.
- 3.10.5** Under no circumstances shall any piece of equipment or a load come within 10 feet of any energized overhead power line or other critical structure.
- 3.10.6** Only trained, qualified, and authorized personnel shall operate mobile equipment. Documentation of training shall be available upon request. Contractor personnel shall not operate Messer equipment unless written authorization is provided by the Messer representative.
- 3.10.7** Loads shall not be suspended from the forks of a forklift or other material handling equipment. An appropriate, manufacturer approved attachment including a locking latch or shackle shall be used to handle suspended loads.
- 3.10.8** Equipment with an elevated load or left running shall not be left unattended for any period of time. Loads must be grounded, the machine must be turned off, and parking brake set when machine is unattended. Equipment is considered unattended when the operator is more than 25' away from the equipment or any time the operator is not in view of the equipment. This does not include road vehicles such as: trucks, cars or tractor trailers.
- 3.10.9** Only trained and qualified persons shall perform maintenance on mobile/heavy equipment. A safe plan of action must be written and communicated anytime the equipment must be serviced while left running.

3.11 Cranes and Rigging

- 3.11.1** All crane operations must be in accordance with the requirements in 1926 Subpart CC – Cranes and Derricks in Construction.
- 3.11.2** The contractor/supplier shall be required to attend any scheduled pre-construction meetings focusing on crane signaling and/or other specific safety issues whenever its work involves or is associated with cranes or whenever the Messer representative deems is necessary.
- 3.11.3** A qualified signal person shall be used whenever the operator's view of the area of operation or direction of travel is obstructed, or whenever it is deemed necessary in response to a specific safety concern.

- 3.11.4 A qualified rigger shall be used for all hoisting operations associated with assembly and disassembly work. Additionally, qualified riggers are required whenever workers are located within the fall zone.
- 3.11.5 If any part of the equipment, load line or load (if operated up to the equipment's maximum working radius in the work zone) could get closer than 20 feet to a power line the requirements of Option 1, 2, or 3 of 1926.1408 shall be met.
- 3.11.6 Contractors/suppliers shall ensure that all crane operators are qualified to operate the equipment safely and are trained and evaluated before operating the equipment. The contractor shall provide Messer with documentation of all qualified operator training at the time the individual arrives on the jobsite.
- 3.11.7 Operators shall not be engaged in activities that distract their attention while operating.
- 3.11.8 Generally, cranes shall not be left unattended while running. However, when crane operation is frequently interrupted during a shift and the operator must leave the crane, the engine may remain running and the following conditions shall apply:
 - 3.11.8.1 Land any load, bucket, lifting magnet, or other device;
 - 3.11.8.2 Disengage the master clutch;
 - 3.11.8.3 Set travel, swing, boom brakes, and other locking devices;
 - 3.11.8.4 Put controls in the off or neutral position
 - 3.11.8.5 Secure the crane against accidental travel;
 - 3.11.8.6 The operator shall be situated where unauthorized entry of the crane can be observed; and
 - 3.11.8.7 The crane shall be located within an area protected from unauthorized entry.
- 3.11.9 Contractors/suppliers shall ensure that crane inspections are performed as required by an appropriate inspector. Special attention shall be given to such items as cables, hoses, guards, booms, blocks, hooks, and safety devices. Prior to operation, current, annual and monthly inspection documentation must be provided to Messer and made available on the piece of equipment. Additionally, shift inspection documentation must be recorded and submitted to Messer at a minimum weekly and/or upon request.
- 3.11.10 The swing radius of the crane counter weights must be barricaded.
- 3.11.11 Working or riding on crane loads suspended, lowered, or hoisted is prohibited except as permitted by, 1926.1431, focusing on crane suspended personnel platforms.
- 3.11.12 Winch trucks shall not have a load suspended from the hook while traveling. The load shall be secured on the bed of the truck. The hook of a winch truck must be tied down or secured in some manner, and not allowed to dangle freely when traveling.
- 3.11.13 Natural and synthetic fiber rope made of materials such as manila, nylon, polyester, or polypropylene shall not be used as slings on mobile equipment.

3.12 Welding and Cutting

- 3.12.1 In areas where welding or other hot work is conducted. In addition to any permanently placed units, a minimum of one 10 lb. ABC dry chemical extinguisher shall be immediately available in the work area. A fire watch and/or hot work permit may also be necessary.
- 3.12.2 Adequate ventilation shall be provided to maintain acceptable atmospheric conditions when welding, cutting, grinding, or heating. Where adequate ventilation cannot be maintained, respirators or air hoods shall be used.
- 3.12.3 Compressed gas cylinders shall be secured in an upright position at all times. Cylinder valves shall be closed when work is interrupted or finished, and when cylinders are empty or being moved.
- 3.12.4 When cylinders are lifted by hoisting equipment, a basket, cradle, or a similar handling device shall be used. Electromagnet, hooks, ropes, or slings shall not be used to lift cylinders, and cylinders shall not be lifted by their caps.
- 3.12.5 Oxygen cylinders shall not be stored close to cylinders of acetylene or other fuel gases, and they must be kept clear of fuel oils, grease, etc. Cylinders stored in the open shall be protected from accumulation of ice and snow, and shielded from direct sun when temperatures are high. Compressed gas cylinders shall be stored so as to avoid possible destruction or obliteration of labels or other means of identifying the contents. Oil or other hydrocarbon contamination shall be avoided on all cylinder gauge connections and regulator devices.
- 3.12.6 Electric arc welding machines shall be disconnected when moved, and turned off when not in use. They shall be disconnected from the primary supply at the end of the workday.
- 3.12.7 Welding cables shall be positioned so they will not be damaged or present a trip hazard.
- 3.12.8 The ground return electrode shall be attached directly to the work to prevent current flow through structures and equipment. All welding cables and connections shall be first quality industrial material, and shall be in good repair.
- 3.12.9 Welding equipment powered by hydrocarbon fuels shall not be used unless proper exhaust venting is provided.
- 3.12.10 All arc welding and cutting operations shall be shielded by non-combustible or flameproof screen, which will protect employees and other persons working in the vicinity from the direct rays of the arc.

3.13 Lasers

- 3.13.1 Only employees who are trained and qualified for laser use shall be allowed to use laser equipment. Those employees who are authorized to operate laser equipment shall have proof of such training/authorization in their possession at all times while equipment is in use.
- 3.13.2 Standard laser warning signs shall be posted at access points to areas where lasers are being used.

3.14 Fire Protection and Prevention

- 3.14.1 The contractor's/supplier's emergency response procedures shall contain provisions for fires or explosions. Contractor/supplier employees shall know the location of and shall be familiar with the fire control equipment. The phone number of the nearest local fire department shall be readily accessible.
- 3.14.2 An adequate number of fire extinguishers of the proper type for the materials exposed and the work performed shall be placed in accessible locations based on the work taking place. Individuals who may use these devices shall be trained in their use. Contractors/suppliers should provide their own extinguishers, especially for activities that require them in the direct vicinity of their work.
- 3.14.3 Extinguishers shall be checked monthly for usage and service condition, and shall be in good operating conditions at all times. Owner extinguishers should only be used in an emergency. Messer representatives shall be notified if an individual discharges an extinguisher other than their own.
- 3.14.4 Equipment and materials shall be stored so as not to block access to fire control and emergency equipment such as fire hydrants, extinguishers, hose racks, alarm boxes, safety showers, self-contained breathing apparatus, etc. A minimum of 15 feet of clearance shall be maintained around fire hydrants.
- 3.14.5 Likewise, materials and equipment shall not block or compromise the integrity of smoke/fire walls and doors. Messer representatives must approve any activity affecting the operation of these devices. The same is true when fire exits may be blocked.
- 3.14.6 Only approved containers shall be used for the storage, transport, and use of flammable substances. Portable containers used for transporting and transferring gasoline or other flammable liquids shall be approved (metal) safety cans equipped with flash arrestors and self-closing lids. All such containers shall be clearly labeled as to its contents. When transferring flammable liquids from one container to another, a bonding wire shall connect the containers.
- 3.14.7 Secondary containment is required for all above ground fuel storage tanks. Double wall storage tanks are also acceptable. In addition, such tanks must be protected from collision damage. Drip pan must be used to prevent any spillage from the dispense nozzle.

- 3.14.8 Areas around welding or flame cutting operations shall be kept free of flammable or combustible materials. Welding, cutting, or any ignition source is not permitted within 50 feet of any refueling, spray painting, or storage of flammable liquids.
- 3.14.9 For mixing and spray application of flammable and combustible materials, only equipment which is approved for that specific use shall be employed.
- 3.14.10 Adequate ventilation to prevent an accumulation of flammable vapors shall be provided where solvents or volatile cleaning agents are used. Extra precaution is needed when solvents are used in the presence of hot surfaces, or where high heat and ultra-violet rays from welding may present an additional hazard from toxic vapors.
- 3.14.11 Fuel fired heating devices shall not be used in confined or unventilated spaces.
- 3.14.12 Open flame heating sources shall not be used in areas where combustibles are stored.
- 3.14.13 No more than 25 gallons of flammable or combustible liquid shall be stored in a room outside of an approved storage cabinet. A maximum of 60 gallons of flammable liquid or 120 gallons of combustible liquid shall be stored in a storage cabinet. Quantities in excess shall be stored in a storage room.
- 3.14.14 Warning signs shall be posted where flammable or combustible materials (solid, liquid, and gas) are stored. “No Smoking” signs shall be posted in areas of possible fire hazards. Contractors/suppliers shall abide by no smoking policies required on specific sites.
- 3.14.15 Liquid Petroleum Gas shall never be stored in a building.
- 3.14.16 An individual designated as a “fire watch” shall be provided by the contractor/supplier when required for hot work activities and shall be trained in the proper operation of fire extinguishers and understand general “fire” protocol.
- 3.14.17 It is the responsibility of each individual to become familiar with the location of the exits that could be used in case of a fire or other evacuation emergencies.
- 3.14.18 Hot Work Permits maybe required as per jobsite specific rules. Work activities which produce: spark, slag or open flame may be required to have a Hot Work Permit.

3.15 Demolition

- 3.15.1 Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a competent person, of the structure to determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. Employer shall document the survey.
- 3.15.2 When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor shall be shored or braced as directed by a PE.

- 3.15.3 No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected. Whenever materials are dropped more than 20 feet to any point lying outside the exterior walls of the building, an enclosed chute shall be used.
- 3.15.4 When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above. Signs, warning of the hazard of falling materials, shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above.
- 3.15.5 All material chutes, or sections thereof, at any angle of more than 45 degrees from the horizontal, shall be entirely enclosed, except for openings equipped with closures at or about floor level for the insertion of materials. The openings shall not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings shall be kept closed when not in use.

3.16 Use of Vehicles

- 3.16.1 Access to the job site shall be according to local regulations. Adequate traffic control signs shall be enforced. Access roadways shall be clearly marked, and shall be used.
- 3.16.2 Contractor/supplier vehicles shall be kept in safe operating condition, and contractor/supplier personnel shall comply with local and site regulations regarding the operation of such vehicles.
- 3.16.3 Contractors/suppliers shall not use or operate Messer vehicles, mobile equipment, or employee vehicles without the specific authorization from the Messer representative.
- 3.16.4 Contractor/supplier employees shall park in designated areas. They shall not park on roadways or service drives, or near doorways, loading bays, dumpster boxes, or access to fire hydrants or hoses. Contractor/supplier personnel shall always check carefully before backing up.
- 3.16.5 Fuel tanks on vehicles shall not be filled while the engine is running. The driver shall stay with the vehicle. Smoking is prohibited during refueling.
- 3.16.6 Vehicle accidents on Messer job sites shall be reported to the Messer representative immediately.
- 3.16.7 All cargo shall be secured. Material hanging over the sides or ends of a truck shall be flagged.
- 3.16.8 Transporting employees on equipment not designed for that specific purpose is prohibited. This includes riding while hanging onto the exterior of a vehicle or mobile equipment. Seatbelt use is mandatory for drivers/operators and passengers in all vehicles and equipment. No one is permitted to ride in the beds of trucks.

3.17 Construction Signage Use

- 3.17.1 Contractors shall install appropriate and effective warning and/or caution signs identifying hazards associated with work being completed.
- 3.17.2 Signs warning of high voltage shall be posted where unauthorized workers might come into contact with live parts such as overhead power lines and electrical closets.
- 3.17.3 Contractors shall ensure Caution-Overhead Work placards/signs are posted where other work activities are taking place near elevated work areas.

3.18 Concrete and Masonry

- 3.18.1 All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement.
- 3.18.2 A limited access zone shall be established whenever a masonry wall is to be constructed. The limited access zone shall conform to the following:
 - 3.18.2.1 The limited access zone shall be established prior to the start of construction of the wall;
 - 3.18.2.2 Be equal to the height of the wall to be constructed plus four feet, and shall run the entire length of the wall;
 - 3.18.2.3 Be established on the side of the wall, which will not contain a scaffold;
 - 3.18.2.4 Be restricted to entry by employees actively engaged in constructing the wall. No other employees shall be permitted to enter the zone;
 - 3.18.2.5 Remain in place until the wall is adequately supported to prevent overturning and to prevent collapse.
- 3.18.3 All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.
- 3.18.4 When overhand brick laying work is performed from scaffolding, the working side of the scaffold shall be protected from falls by guardrails or three courses of material with an effective height of no less than 24 inches above the work platform.
- 3.18.5 Dust control methods must be used when cutting, chipping, grinding, sand blasting or any other process involving concrete, block or brick. Wet methods must be used as first means of dust control. If not feasible, alternative methods must be in compliance with OSHA Respirable Crystalline Silica Standards.
- 3.18.6 Adequate eyewash facilities must be readily available for all employees working with fresh (uncured concrete or brick) cleaning solutions.
- 3.18.7 Workers placing concrete from a chute, concrete bucket or hose shall wear adequate eye and face protection.

4.0 HEALTH REQUIREMENTS

4.1 Hazardous/Toxic Substances

- 4.1.1 The contractor/supplier shall develop and maintain a written Hazard Communication Program as required by 29 CFR 1926.59. The written program shall be submitted to the Messer representative prior to beginning work. Contractor/supplier employees and appropriate regulatory officials shall have access to the program. Contractor/supplier shall be responsible for ensuring that sub-tier contractors/suppliers have copies of their Hazard Communication programs on the job sites.
- 4.1.2 The written program requirements include a current list of hazardous chemicals present at the site, a labeling system for containers of chemicals at the work site including dispensing/transfer containers, and corresponding Safety Data Sheets (SDS).
- 4.1.3 The contractor/supplier shall submit copies of all relevant SDS's to the Messer representative before the materials are brought on site.
- 4.1.4 Safety Data Sheets (SDS) shall be requested / obtained from the vendor for all hazardous chemicals or materials brought on site by the contractor. Container labels or warning systems for hazardous chemicals/materials shall include the name of the chemical/material the hazard is associated with, its use and exposure, and any necessary precautions.
- 4.1.5 Contact or exposure to hazardous chemicals/materials exceeding Permissible Exposure Levels (PEL) shall be avoided, preferably through the implementation of engineering or administrative controls. Where such controls are infeasible, appropriate personal protective equipment such as chemical resistant clothing, gloves, aprons, goggles and respirators shall be used. Unnecessary contact with any hazardous materials shall be avoided.
- 4.1.6 Messer representatives shall be notified immediately of a spill or release of a hazardous material. Messer representatives shall inform the owner of the occurrence.
- 4.1.7 Hazardous and/or toxic materials such as solvents, coatings, or thinners shall be stored in approved containers. Original shipping containers that satisfy local safety regulations are considered approved containers for transporting and storing these materials. All hazardous or toxic materials shall be returned to the designated storage area at the end of each shift. Hazardous, toxic or flammable materials shall not be stored in occupied buildings.
- 4.1.8 The contractor/supplier shall train its employees about the contractor's/ supplier's obligations under the law, and hazards and protective measures of chemicals to which they may be exposed. The contractor/supplier shall train its employees on the meaning of any labels, symbols, colors or other codes that might be used at the work site by the contractor, Messer employees, or other contractors/suppliers, to warn of particular worksite hazards. All such training shall be documented and retained by the contractor/supplier, with a copy provided to the Messer representative upon request.

- 4.1.9 Contractors/suppliers engaged in renovation or demolition projects shall ensure employees are trained in the potential environmental health hazards of such work. This includes a minimum of awareness level training in asbestos, lead and mold. Training shall be documented and available to Messer upon request.
- 4.1.10 Contractors/suppliers whose work creates excessive dust or fumes shall provide adequate engineering controls such as an exhaust or ventilation system, and/or conduct work at “off hours”, as approved by the Messer representative. Exhaust and/or ventilation systems must be reviewed with the Messer representative prior to implementation.
- 4.1.11 All equipment with combustion engines used indoors shall be fueled with LP gas, exhausted to the exterior, or be fitted with oxy-cat mufflers. The areas shall also be monitored for carbon monoxide.

4.2 Respiratory Protection

- 4.2.1 The contractor/supplier shall protect personnel and the public from exposures to dust, fumes, vapors, mists or gases in excess of Permissible Exposure Limits (PEL) or Short Term Exposure Limits (STEL), as referenced by the Occupational Safety and Health Administration (OSHA), American Conference of Governmental and Industrial Hygienist (ACGIH).
- 4.2.2 Where exposure is unavoidable, and engineering or administrative controls such as isolation of the hazardous materials, ventilation or limiting exposure periods may not provide adequate protection, use of approved respirators shall be required.
- 4.2.3 Personnel shall wear appropriate respiratory protection when applying toxic or hazardous materials inside tanks, rooms, or other areas where adequate ventilation does not exist.
- 4.2.4 Personnel required to wear respiratory protection shall be trained, fit tested, and medically qualified to wear such devices. Documentation shall be made available upon request. Contractors/suppliers shall ensure that sub-tier contractors/suppliers have this information available for review.
- 4.2.5 The contractor/supplier shall implement a respiratory program, which includes proper maintenance and care of the respirators and any related equipment.

4.3 Medical Surveillance

- 4.3.1 Individuals, depending upon the type of work and qualifications, may be required to be medically qualified prior to doing certain types of work, or where exposure to certain hazardous materials exists.
- 4.3.2 The contractor/supplier shall provide post exposure surveillance when deemed necessary.

4.4 Hearing Conservation and Noise Control

- 4.4.1 Hearing protection is required in all posted high noise level areas of Messer projects. Hearing protection may also be required where excess noise exposure exists even on a temporary basis. This would include situations where equipment such as jackhammers, saws, drills, grinders, or heavy equipment is being utilized, and the 90-decibel level is exceeded. The contractor shall implement the necessary hearing protection to respond to these noise hazards.
- 4.4.2 Areas where noise levels exceed the 90-decibel standard on a routine shall require adequate hearing protection, and this requirement shall be effectively communicated to those affected. Employees shall also wear adequate PPE when working in areas where noise levels exceed the 90-decibel standard on a temporary and/or intermittent basis. This protection could include muffs, plugs, or a combination thereof. Individuals required to wear such hearing protection shall be properly fitted and trained.
- 4.4.3 Where routine exposure to noise in excess of the 85 TWA (Time Weighted Average, 8-hour Workday) decibel level occurs, the contractor personnel are subject to the provisions of the OSHA Hearing Conservation Standard. This includes audiometric testing, employee training and any other applicable requirements.

4.5 Asbestos Containing Materials

- 4.5.1 If asbestos is suspected or materials containing asbestos are discovered on site, Messer representatives shall be notified immediately. All work in and around the suspected materials shall cease until a determination is made by a qualified third party, and any necessary abatement is completed.
- 4.5.2 Individuals involved with the handling, removal, demolition, and/or disposal of materials containing asbestos shall comply with OSHA, EPA, and other state and/or local standards governing this activity.
- 4.5.3 The OSHA Asbestos Standard requires that personnel working with asbestos shall be properly trained, monitored for exposure, and medically surveyed where necessary. Engineering controls and personal protective equipment shall be utilized to prevent exposures in excess of the Permissible Exposure Limit (PEL).
- 4.5.4 Individuals shall comply with Environmental Protection Agency (EPA) removal requirements for asbestos including: written notification prior to removal, utilization of emission controls, and special handling and disposal procedures.
- 4.5.5 All individuals hired to perform asbestos abatement work shall be properly bonded, insured, and licensed by the appropriate governing agencies.
- 4.5.6 All individuals hired to perform lead abatement shall be properly bonded, licensed, and insured, as required by the appropriate governing agencies.

- 4.5.7 The employer handling abatement work shall confirm or deny materials contaminated with asbestos through the necessary documented testing/surveying resources. This testing may be conducted through an established third party testing agency.

4.6 Lead Containing Materials

- 4.6.1 If lead is suspected or materials containing lead are discovered on site, Messer representatives shall be notified immediately. All work in and around the suspected materials shall cease until a determination is made by a qualified third party and any necessary actions take place.
- 4.6.2 All individuals hired to perform lead abatement and/or disturbing lead-containing surfaces shall be properly bonded, licensed, and insured, as required by the appropriate governing agencies.
- 4.6.3 Individuals involved with the handling, removal, demolition, and/or disposal of materials containing lead shall comply with, EPA, and other state and/or local standards governing this activity. Individuals shall specifically comply with the OSHA Construction Standard, 1926.62.
- 4.6.4 Unless sampling results verify zero concentrations of lead, all existing painted surfaces that will be disturbed shall be assumed to be lead-containing.
- 4.6.5 An exposure assessment/air monitoring shall be conducted to determine the anticipated exposure levels of individuals disturbing the lead-containing surfaces, and the type of protection needed when doing such.
- 4.6.6 All employees performing this type of work shall be trained on the hazards of lead exposure, participate in a medical surveillance program, when necessary and shall be trained on and shall use the appropriate protective equipment.

4.7 Silica

- 4.7.1 Any contractor/suppliers performing potential silica-related work shall submit a written silica exposure control plan prior to beginning work and must identify a competent person for the project. The silica exposure control plan shall include task-specific controls that are in compliance with OSHA Table 1 or documentation of appropriate protection must be provided for alternate controls.
- 4.7.2 Contractor/suppliers shall identify a competent person for the project and shall ensure workers are trained on operations that could result in exposure to silica and proper control measures in compliance with the OSHA standard.

- 4.7.3 Dry sweeping without dust compounds and use of compressed air for cleaning of silica containing dust is strictly prohibited. Dust containing silica shall be wet swept, swept using appropriate sweeping compound or vacuumed using an approved HEPA vacuum and filter.

4.8 Industrial Hygiene and Exposure Standards

- 4.8.1 The contractor/supplier shall be responsible for determining potential job-related health risk exposures as well as the applicable Permissible Exposure Level (PEL) or standard.
- 4.8.2 Where the potential exists for employee exposure to occupational health risk(s) at the job site, the contractor/supplier shall identify and evaluate those risk(s) relevant to its work activity, through various means including medical surveillance, monitoring of health complaints, incident reports and workers' compensation claims, and industrial hygiene sampling and personnel exposure monitoring methods.
- 4.8.3 For industrial hygiene sampling/exposure monitoring, the contractor/supplier shall be responsible for providing the necessary equipment and expertise to do the work. Samples/monitoring results shall be sent to a NIOSH-approved laboratory for evaluation. Results from sampling/monitoring shall be communicated to affected employees with a written record submitted to the Messer representative upon request.

4.9 Moisture Intrusion and Mold

- 4.9.1 While mold may not be completely eliminated during construction activities, Messer requires the following steps to be taken to control mold and minimize any adverse effects:
 - 4.9.1.1 Notify the Messer management team immediately following a water intrusion or the identification of mold;
 - 4.9.1.2 Dry water-damaged areas and materials as soon as possible, within 24 hours and not later than 48 hours after the water intrusion event;
 - 4.9.1.3 Replace porous materials as they cannot be cleaned effectively. Clean non-porous surfaces with detergent and water, and dry them completely.
- 4.9.2 Contractors can often clean a small outbreak of mold. However, if mold growth is extensive, consult a professional with experience. When using disinfectants or biocides, always ventilate the area, using outside air if possible, and exhaust the air to the outdoors. During cleanup employees shall wear long-sleeve shirts and pants that can be washed or discarded after the work. Gloves and eye protection shall be worn as well. And when using cleaning materials such as biocides or disinfectants, follow the manufacturer's directions and wear recommended personal protective equipment, which may include respiratory protection.

4.10 Hexavalent Chromium

- 4.10.1 The contractor is required to meet all applicable requirements under section 1926.1126 and/or Appendix C-1: Portland Cement Inspection Procedures. Implementation will include but not limited to air sampling, employee training, medical surveillance, protective equipment, and suitable hand washing facilities.

5.0 ENVIRONMENTAL REQUIREMENTS

5.1 Protection of the Environment

- 5.1.1 The contractor/supplier shall be knowledgeable of and comply with all federal, state, and local environmental regulations for materials, including hazardous substances or wastes, under its control. The contractor/supplier shall not dump, release, or otherwise discharge or dispose of any such materials without the express authorization of the Messer representative.
- 5.1.2 Any release of a hazardous substance to the environment, whether into the air, water, or ground, must be reported to the Messer representative immediately.
- 5.1.3 If a release resulting from contractor actions occur, the contractor/supplier shall take proper measures to counter any known environmental or health hazards associated with such a release. These would include remedial procedures such as spill control, containment, and disposal. Documentation of proper disposal shall be provided to Messer. The contractor/supplier shall also provide notification to the proper authorities.

5.2 Air Pollution

- 5.2.1 The contractor/supplier, depending on the type and quantity of materials, may be required to have an emergency response plan for any releases of materials to the atmosphere. The contractor/supplier shall also be aware of local ordinances affecting air pollution.

5.3 Water Pollution

- 5.3.1 Where materials under contractor/supplier control could be discharged to the ground or to the water, the contractor/supplier shall be aware of and comply with local sewer ordinances or other requirements, which may prohibit the discharge of certain materials into the sewer system.
- 5.3.2 The contractor/supplier shall obtain any necessary permits for materials under its control. These permits include, but are not limited to, National Pollutant Discharge Elimination System (NPDES) permits, Public Owned Treatment Works (POTW) contracts, Storm Water Control Permits, and Spill Prevention Control and Countermeasure (SPCC) plans, as well as any local or regional requirements relating to such.

SECTION 008260
JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC
INCLUSION AND WORKFORCE DEVELOPMENT
FOR THE BANKS PROJECT

PART 1 GENERAL

1.1 SUMMARY

- A. Joint Policy for Disadvantaged Business Enterprise, Economic Inclusion and Workforce Development
- B. Subcontractor Approval Request (Form 2004)
- C. Subcontractor Monthly Business Utilization Report (Form 2005)
- D. Subcontractor Substitution (Form 2006)
- E. Workforce Monthly Tracking (Form WF-01)
- F. Workforce Number of Employees Report (Form WF-02)
- G. Workforce Monthly Employee Information Report (Form-WF-03)

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

THE BANKS PROJECT

Small Business Enterprise Program Summary

DOCUMENT 001000.11

Hamilton County (the "County") and the City of Cincinnati (the "City") are committed to maximizing subcontracting and procurement opportunities for all qualified and available small business enterprises ("SBEs"). For this purpose, the County and the City (The "Public Parties") have established the Banks Small Business Program (the "SBE Program"). The SBE Program requires Contractors to use their "good faith efforts" to facilitate achievement of SBE participation goals.

The requirements of the SBE Program do not apply to individual contracts and/or procurements valued at \$5,000.00 or less. The SBE Program includes the following components:

- **SBE Participation Goal:** This component **encourages** Contractors to make subcontracting opportunities available to small businesses which have been certified as SBEs by the City in order to achieve the percentage SBE participation goal assigned to the related contract as specified in the bid/RFP/RFQ package. To count towards the SBE participation goal, the SBE must be certified in the commodity or service code(s) that will be used on the project. A list of SBEs certified by the City is available on the City's website at <http://cincinnati.diversitycompliance.com> or from the City's Office of Contract Compliance ("OCC").
- **Outreach/Good Faith Efforts.** This component requires Contractors to provide evidence of the outreach efforts made to SBEs in connection with the contracts related to the Banks Project.

All contracts and procurements awarded for the Banks Project, except those for professional services, will be awarded to the "lowest and best" bidder. Therefore, the inability of a Contractor to meet the SBE goals established under the SBE Program will not exclude the Contractor from award of a contract or procurement if the Contractor's proposal or bid otherwise is deemed by the County and/or the City, as the case may be, to be the "lowest and best bid." However, a Contractor's failure to submit a SBE utilization plan with the Contractor's proposal or bid may result in a determination that the submitted proposal or bid is non-responsive, and rejection of the proposal or bid.

Pursuant to the SBE Program requirements, the following items are included in the bid/RFP/RFQ package and must be completed, signed and submitted with each submitted proposal or bid; failure to complete these forms with all the requested information may cause a proposal or bid to be determined to be non-responsive:

1. **Statement of Good Faith Efforts (Form 2007)**
2. **Outreach/Good Faith Summary Sheet (Form 2007-a)**
3. **Subcontractor Utilization Plan (Form 2003)**

The following forms are included in the proposal or bid invitation package for information purposes only and do not have to be completed or returned with the proposal or bid.

1. **Form 2004 – Subcontractor Approval Request: (must be completed and submitted to OCC after contract award and prior to commencement of work on the project).**
2. **Form 2005 – Subcontractor Monthly Business Utilization Report: (must be submitted with monthly invoice).**
3. **Form 2006 – Subcontractor Substitution Form: (must be submitted for advance approval for any proposed change in subcontractors).**

**If you have any questions or need assistance in meeting these requirements, please feel free to contact
OCC at (513) 352-3144 or Andra Conaty at (513) 946-3894.**

(The Banks - Revised March, 2019)

**The Banks – Public Infrastructure Development Parking Garage and Street Grid
SBE/DBE Subcontractor Utilization Plan**

Bid or Proposal Reference Number: _____

Contract Description:	Total Bid Amount: \$	Date submitted:
Contractor Name/Address/City/State/Zip/Phone:	Federal Tax ID Number:	Type of Inclusion Program (circle one): SBE DBE

Contractor is certified by the City of Cincinnati Office of Contract Compliance as an SBE and meets the SBE participation goals without using other SBEs: Yes or No

OR

Contractor is certified through the Ohio DBE Unified Certification Program as a DBE and will self-perform _____ % of the DBE participation goal. Yes or No

The above named Contractor proposes to use the services of the following listed subcontractor/supplier(s) demonstrating sufficiency to meet or exceed the SBE/DBE participation goal. The contractor must list all SBEs/DBEs, regardless of contract amount or type of service. Failure to complete this form with all the requested information (as indicated in each column) may cause a bid or proposal to be determined non-responsive.

Name/Address/City/State Zip/Phone	Federal Tax ID#	Describe Exact Type Of Work /Supplier	Subcontract Dollars	Subcontract/Supplier Percentage of Contractors Total Bid Amount	FOR OFFICE USE ONLY (SBE/DBE CALCULATION)

The Contractor certifies that the above information is true to the best of its knowledge. The Contractor acknowledges and agrees that, if awarded the contract, the information provided on this Form 2003 shall be incorporated into the terms and conditions of the final contract between the Owner and the Contractor, as long as the Subcontractor(s) meet the approval of the Owner (see Form 2004). Contractor acknowledges and agrees that any changes to the above information, after the contract is awarded, must be submitted in writing on the Substitution Form 2006 and approved in advance by the Owner.

CONTRACTOR REPRESENTATIVE (SIGNATURE): _____

PRINTED NAME: _____ **Title:** _____ **Date:** _____

If Additional Space is Needed, Please Use Copies of This Form.

Bid Submission Document	Print Legibly or Type
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The Banks – Public Infrastructure Development Parking Garage and Street Grid

Statement of Good Faith Efforts

Bid or Proposal Reference Number: _____ Type of Inclusion Program: SBE or DBE

By the signature below of an authorized representative, Contractor certifies that Contractor has utilized the following methods to obtain the maximum practical participation by Small Business Enterprises (SBEs) certified by the City of Cincinnati Office of Contract Compliance or Disadvantaged Business Enterprises (DBEs) certified through the Ohio DBE Unified Certification Program. Please indicate which methods used by placing an X in the appropriate space.

YOU MUST SUBMIT YOUR SUPPORTING DOCUMENTATION WITH YOUR BID. NEW INFORMATION WILL NOT BE ACCEPTED AFTER THE BID CLOSING DATE.

1. ____ Identified sufficient subcontracting work to meet goal (attach content of advertisements and written notices to SBEs/DBEs indicating type of work to be subcontracted).
2. ____ Bidder has coordinated SBE/DBE inclusion efforts with the Economic Inclusion Consultant, Messer Construction Co. (513-482-5419 or swalton@messer.com) to ascertain the availability of SBE/DBE subcontractors/subconsultants/suppliers for the scopes of work.
3. ____ Advertising - Attach content of advertisements, which must include project name, Contractor's name, work available, contact person's name and number, information on availability of plans and specifications and Contractor's policy concerning assistance to SBEs/DBEs in obtaining bonding, financing, and/or insurance; also provide date of advertising and names of publications.
4. ____ Written notice to SBEs/DBEs for subcontracting opportunities (submit copy of each letter sent, confirmation of receipt by SBE/DBE, or if available master notification, submit copy of letter and recipient list).
5. ____ Notice described in item 4., above, was sent at least five (5) business days prior to the bid opening date.
6. ____ Follow-up initial solicitations, attach copies of Outreach/Good Faith Summary Sheet (Form 2007-A).
7. ____ Assistance with securing bonding, financing and/or insurance (submit copy advertising and written notice to SBEs/DBEs).
8. ____ Provision of plans, specifications and requirements: Contractor provided interested SBEs/DBEs with access to plans, specifications and requirements for subject project.
9. ____ Provide documentation detailing reason(s) why agreement was not reached with SBEs/DBE (s) who responded affirmatively in writing. Include written explanation for rejection of SBE/DBE proposals.
10. ____ Other (Please list any other methods utilized that are not covered above):

Name of Contractor

Contractor Representative (Signature)

Date

Contractor Representative (Printed Name)

Title

The Banks – Public Infrastructure Development Parking Garage and Street Grid SBE/DBE Outreach & Good Faith Efforts Summary Sheet

Bid or Proposal Reference Number: _____

Contractor/Consultant Name:			Address/City/State/Zip/Telephone:		
Bid/Proposal Name:			Bid/Proposal Due Date:		Type of Bid Package: DBE or SBE
SBE/DBE Subcontractor/Supplier's (Name/Address/City/State/Zip)	Type of Work/Supplies Solicited	Indicate Date and How SBE/DBE Contacted (e.g., Letter, Phone, Fax, etc)	SBE/DBE Response to Solicitation (e.g., Will Submit Bid, No Response, Not Interested) and Date	Contact Person	Phone Number

Please list above the name(s) of all firms contacted and their responses to the specified proposal or bid package. If additional space is required this form may be duplicated.

I hereby certify that the above information is true and accurate:

Contractor Representative Signature

Print Name/Title

Date _____

The Banks – Public Infrastructure Development Parking Garage and Street Grid

FORM 2004
SUBCONTRACTOR APPROVAL REQUEST
Statement of Intent to Utilize Firms

Bid or Proposal Reference Number: _____

This form must be completed for each subcontractor, subconsultant and/or supplier, and submitted to the Construction Manager after bid opening, but before contract award and before work begins. Information recorded herein will be incorporated in the Contractor's contract. All subcontractors and/or suppliers must be approved prior to starting work on the project.

Contractor Name	Type of Inclusion Program (circle one): SBE DBE	Contract Amount \$
Contractor Representative	Title	Telephone Number
Contractor Address	City/State	Zip Code
Federal Tax ID #	E-mail Address	

SUBCONTRACTOR

Subcontractor Name	Address	City/State/Zip Code
Subcontractor Representative	Title	Telephone Number
Federal Tax ID #	E-mail Address	

Is Subcontractor a SBE certified by the City of Cincinnati Office of Contract Compliance? YES or NO
OR
Is Subcontractor a DBE certified through the Ohio DBE Unified Certification Program? YES or NO

ITEM NUMBER	DESCRIPTION OF WORK AND/OR SUPPLIES	SUBCONTRACTOR'S CONTRACT AMOUNT \$	% OF TOTAL CONTRACT PRICE	ESTIMATED START DATE	COMPLETION DATE
	Total Value of Work				

SIGNATURES

Subcontractor Representative	Date
Contractor Representative	Date
City of Cincinnati Contract Compliance Officer	Date
Hamilton County Compliance Officer	Date

[illegible]

If Additional Space is Needed, Please Use Copies of This Form.



THE BANKS PROJECT
SBE/DBE/MBE/WBE SUBCONTRACTOR SUBSTITUTION REQUEST
Bid Reference No. _____

THIS FORM MUST BE COMPLETED AND APPROVED BY THE BANKS REVIEW COMMITTEE PRIOR TO TERMINATING A CONTRACT WITH A SMALL BUSINESS ENTERPRISE (SBE) OR DISADVANTAGED BUSINESS ENTERPRISE (DBE) AFTER THE BIDS OR PROPOSALS HAVE BEEN SUBMITTED OR CONTRACT HAS BEEN AWARDED. **CONTRACTOR MUST PROVIDE A WRITTEN EXPLANATION FOR THE SUBSTITUTION REQUEST.** INFORMATION RECORDED HEREIN WILL BE INCORPORATED IN THE AWARDEES' CONTRACT.

Company Name: _____ **Project Name:** _____

Address: _____ **Date Submitted** _____

_____ will be substituted for _____ to perform work on
(Name of Subcontractor/Supplier) *(Name of Subcontractor/Supplier)*

Or supply goods for the above described contract.

_____ will enter into a formal agreement for the work upon approval by the Owner and agrees with
(Subcontractor/Supplier)

New Subcontractor/Supplier EIN#: _____ Circle Type of Business: SBE DBE MBE WBE NONE

Must attach a copy of the reason for SBE substitution for review prior to any contractor performing work on this portion of the project.

ITEM NUMBER	DESCRIPTION OF WORK	SUBCONTRACT/P.O. PRICE	% OF TOTAL CONTRACT PRICE	START DATE	COMPLETION DATE
	<u>Total Value of Work</u>				

Prime/General Contractor:

Signature of Company Representative _____

Title: _____ **Date:** _____ **EIN#:** _____

Subcontractor/Supplier Replaced: I relinquish my quote for the above contract.

Signature of Company Representative _____

Title: _____ **Date:** _____ **EIN#:** _____

Request : Approved _____ Denied _____

_____ Date _____

Authorized Committee Representative Signature

JOINT POLICY FOR SMALL BUSINESS ENTERPRISE, ECONOMIC INCLUSION AND WORKFORCE DEVELOPMENT FOR THE BANKS PROJECT

1. Banks Project Economic Inclusion Policy

1.1 Purpose. The Banks project is a joint property development project of Hamilton County, Ohio (the “County”), the City of Cincinnati, Ohio (the “City”) and a master developer, Riverbanks Renaissance, LLC (the “Developer”). The Mayor of the City, Cincinnati City Council (the “Council”) and the Commissioners of Hamilton County, Ohio (the “Commissioners”) have established this Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development (this “Banks Inclusion Policy”) for the Banks development project (the “Banks Project”) for the purpose of promoting equal business opportunity for small and disadvantaged businesses, including minority-owned and women-owned firms, and to ensure that such businesses receive or participate directly or indirectly in contracts and procurements related to the Banks Project awarded by the County and/or the City. Further, this Banks Inclusion Policy has been adopted to support and encourage the participation of small businesses and disadvantaged businesses, including, but not limited to, those owned by minorities and women, in the retail, hospitality and entertainment components of the Banks Project through active recruitment, facilitation of relationships and aggressive information-sharing. This Banks Inclusion Policy also has been established for the purposes of ensuring non-discrimination in the award and administration of such contracts and procurements and to promote the economic inclusion of qualified workers in the local region through employment opportunities related to the Banks Project.

2. Non-Discrimination Policy

2.1 Contracts and Procurements. The County and the City each is an equal business opportunity government which provides, and will continue to provide, equal access to contracting and procurement opportunities for all businesses. It is the policy of the County and the City that no contracts should be awarded, and no procurement decisions should be made, by or on behalf of the County and/or the City as the result of unlawful discrimination based upon race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth.

2.2 Employment. The County and the City each has a long-standing commitment to ensuring non-discrimination and equal opportunity in employment. Under federal and state laws, the County and the City are obligated to avoid unlawful discrimination, to ensure that their respective contractors and suppliers avoid unlawful discrimination, and to ensure that contractors, subcontractors and suppliers for the Banks Project are selected by the County, the City and their respective contractors and suppliers without engaging in unlawful discrimination. Prior to being awarded a contract or procurement with the County or the City, each Contractor shall be required to certify in writing to the County or the City, as the case may be, that (a) the Contractor will comply with all of the requirements of this non-discrimination policy (the “Non-discrimination Policy”) and (b) the Contractor, directly or indirectly, (i) has not engaged, is not

engaged and will not engage in any kind of unlawful discrimination involving race, color, religion, sex, sexual orientation, national origin, ancestry, disability, veteran status, age, political belief or place of birth, whether or not such unlawful discrimination is related to a contract or procurement activity involving the Banks Project, and (ii) will not, for any purpose related to the Contractor's engagement with respect to the Banks Project, employ or contract with any person or business which the Contractor knows or has reason to know has engaged, is engaged, or will engage in such unlawful discrimination, whether or not such unlawful discrimination is related to a contract or procurement activity or involving the Banks Project. As used herein, "**Contractor**" means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

3. DBE Policy Statement and Objectives [49 CFR Part 26.23]

3.1 Policy and Objectives. The County and the City have received, or may receive, federal financial assistance from the U. S. Department of Transportation (the "DOT") to finance a portion of the Banks Project and, as a condition to receiving such assistance, must comply with DOT regulations under 49 CFR Part 26, "*Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs*". In order to comply with DOT requirements and to give effect to this Banks Inclusion Policy, the County and the City have adopted this Disadvantaged Business Enterprise (as defined below) policy ("DBE Policy") and have established a Disadvantaged Business Enterprise program for DOT-assisted contracts related to the Banks Project (the "DBE Program") in accordance with applicable DOT regulations. It is the policy of the County and the City to ensure that DBEs as defined in 49 CFR Part 26 have an equal opportunity to receive and participate in DOT-assisted contracts ("DBE Policy"). It also is the policy and objectives of the County and the City:

- (a) To ensure non-discrimination in the award and administration of DOT-assisted contracts;
- (b) To create a level playing field on which DBEs can compete fairly for DOT-assisted contracts;
- (c) To ensure that only firms that fully meet eligibility standards set forth in 49 CFR Part 26 are permitted to participate as DBEs in the DBE Program;
- (d) To ensure that the DBE Program is narrowly tailored in accordance with applicable law;
- (e) To help remove barriers to the participation of DBEs in DOT-assisted contracts; and
- (f) To assist with the development of firms that can compete successfully in the marketplace outside of the DBE Program.

3.2 Liaison Officer. The Director of Hamilton County Small Business Development has been designated as the DBE liaison officer for the DBE Program (the “DBE Liaison Officer”). In that capacity, he/she is responsible for implementing all aspects of the DBE Program and ensuring that the County and the City comply with all provisions of 49 CFR Part 26 in connection with the award and performance of DOT-assisted contracts related to the Banks Project. Implementation of the DBE Program shall be accorded the same priority as compliance with all other legal obligations incurred by the County and the City in their financial assistance agreements with the DOT. The DBE Liaison Officer shall have direct and independent access to the Commissioners, the County Administrator of Hamilton County (the “County Administrator”), the Mayor of Cincinnati (the “Mayor”) and the Council with respect to matters concerning the DBE Program. [49 CFR Part 26.25]

3.3 Dissemination of Policy. The County has disseminated or will disseminate this DBE Policy statement to the Commissioners and all departments and divisions of the County. The City has disseminated or will disseminate this DBE Policy statement to the Mayor and all departments and divisions of the City. This DBE Policy statement also shall be distributed to DBEs and non-DBE business communities that currently perform, or have performed, work for the County or the City on DOT-assisted contracts by publishing this statement in general circulation, minority-focused and trade association publications, by electronic or regular mail to local disadvantaged business development organizations and by posting a copy of this DBE Policy statement on the County’s website and the City’s website. [49 CFR Part 26.23]

3.4 No Quotas or Set-Asides. Neither the County nor the City will use quotas or will set aside contracts for DBEs on DOT-assisted contracts or in any way in the administration of the DBE Program, except as permitted under DOT regulations to address egregious instances of unlawful discrimination. [49 CFR Part 26.43]

3.5 Expiration. The County and the City shall continue to carry out the DBE Program until all funds from DOT financial assistance for the Banks Project have been expended. [49 CFR Part 26.21(c)]

4. DBE Program Requirements

4.1 Definitions. [49 CFR Part 26.5]

4.1.1 “**Disadvantaged Business Enterprise**” or “**DBE**” means a for-profit small business concern that is at least 51% owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51% of the stock is owned by one or more such individuals; and whose management and daily business operations are controlled by one or more socially and economically disadvantaged individuals who own it. To be eligible for DBE certification under the DBE Program, (i) a firm (including its affiliates) must be an existing small business, as defined by the U. S. Small Business Administration (“SBA”) standards, and must not have average annual gross receipts as defined by SBA regulations over the firm’s previous three fiscal years in excess of \$20.41 million (subject to adjustment from time to time for inflation); [49 CFR Part 26.65]

4.1.2 **“DOT-Assisted Contract”** means any contract between the County and/or the City and a contractor (at any tier), funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees, except a contract solely for the purchase of land;

4.1.3 **“Socially and economically disadvantaged individual”** means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:

(a) An individual who the County or the City finds to be a socially and economically disadvantaged individual on a case-by-case basis;

(b) An individual in one or more of the following groups, members of which are *rebuttably presumed* to be socially and economically disadvantaged:

(i) “Black Americans,” which includes persons having origins in any of the Black racial groups of Africa;

(ii) “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(iii) “Native Americans,” which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

(iv) “Asian-Pacific Americans,” which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

(v) “Subcontinent Asian Americans,” which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women; and

(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

An individual whose personal net worth exceeds \$750,000 (excluding the individual’s ownership interest in the firm applying for DBE certification, the individual’s equity in his or her primary residence and any contingent liabilities) is deemed not to be economically disadvantaged. [49 CFR Part 26.67(d)]

All terms used in this DBE Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in 49 CFR Part 26.

4.2 Non-Discrimination. [49 CFR Part 26.7] Neither the County nor the City will exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract covered by 49 CFR Part 26 on the basis of race, color, sex, or national origin. In administering the DBE Program, neither the County nor the City will, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the DBE Program with respect to individuals of a particular race, color, sex or national origin.

4.3 DBE Financial Institutions. [49 CFR Part 26.27] The County and the City will investigate thoroughly the full extent of services offered by financial institutions owned and controlled by socially and economically disadvantaged individuals in the County, if any, and shall make reasonable efforts to use these institutions and to encourage prime contractors for DOT-assisted contracts related to the Banks Project to use such institutions. Any information on the availability of such institutions shall be maintained by the DBE Liaison Officer.

4.4 DBE Directory. [49 CFR Part 26.31] The County and the City shall maintain and make available to interested persons a directory identifying all firms eligible to participate as DBEs in the DBE Program. For each firm, the directory will include its address, phone number, and types of work the firm has been certified to perform as a DBE. The directory will be made available on request to interested persons, including bidders, for work related to the Banks Project in connection with their efforts to meet the DBE goals established by the County and the City and made a part of bid specifications. The directory will serve as a primary source for locating potential contractors and suppliers. The directory will be revised at least annually and updated information included in the directory will be made available to contractors and the public on request.

4.5 Required Contract Clauses. Both the County and the City will require the following assurance to be included in every DOT-assisted contract between the County or the City, as the case may be, and a contractor, and in each subcontract the contractor signs with a subcontractor:

“The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the County and/or the City deems appropriate.” [49 CFR Part 26.13(b)]

The County and the City will include the following clause in each DBE-assisted prime contract:

“The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the prime contractor receives from the County and/or the City. If the County and/or the City require retainage from the prime contractor and incremental acceptances of portions, as determined by the County or the City, as the case may be, of the contract work are made by the County and/or the City, then the prime contractor agrees to return all related retainage from subcontractors, if any, within ten (10) days after receiving payment from the County and/or the City for the contract work satisfactorily completed and accepted by the County and/or the City, including such incremental acceptances of portions of such work. Any delay or postponement of payment over ten (10) days may occur only for good cause following written approval of the County and/or the City, as applicable, which approval shall not be unreasonably withheld, conditioned or delayed. This clause applies to both DBE and non-DBE subcontracts. Each subcontractor shall provide in all contracts with lower tier subcontractors or suppliers clauses requiring that the subcontractor shall pay the lower tier subcontractors and suppliers in accordance with the foregoing provisions. Any violation of these provisions by the prime contractor may be considered a breach of contract and may result in the suspension or termination of this contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and DOT. The foregoing requirements shall not be construed to limit or impair any contractual, administrative or judicial remedies otherwise available to the prime contractor or any subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontractor performance and/or noncompliance by a subcontractor.” [49 CFR Part 26.29]

4.6 Monitoring and Enforcement Mechanisms. [49 CFR Part 26.37]The County and the City will monitor DBE contracts, DBE scheduled work and payments to contractors related to the Banks Project in order to ensure compliance with this DBE Program and that work committed to DBEs at contract award is actually performed by DBEs. Non-compliance with this DBE Policy by the offending party may be considered a breach of contract and may result in the suspension or termination of that party’s contract or such other remedy as deemed appropriate by the County or the City, as the case may be, and the DOT. The County and the City will bring to the attention of the DOT any false, fraudulent, or dishonest conduct in connection with the DBE Program known to the County or the City, as the case may be, as provided in 49 CFR Part 26.109. [49 CFR Part 26.37] The County and the City also will consider similar action under the County’s or the City’s own legal authorities granted through the contract documents, including responsibility determinations in future contracts.

4.7 Overall DBE Goals. [49 CFR Part 26.45]

(a) The County and the City, together with the Ohio Department of Transportation (“ODOT”), are required to and have established an overall goal for DBE participation in DOT-assisted contracts related to the Banks Project in accordance with the provisions of 49 CFR Part 26.45. The overall DBE participation goal must be based on demonstrable evidence of the availability of DBEs in the County which are ready, willing and able to participate in the DOT-assisted contracts relative to all businesses in the County which are ready, willing and able to participate in such contracts. The goal also must reflect the determination of the County, the City and ODOT of the level of DBE participation expected

absent the effects of discrimination. The overall goal for utilization of DBEs in connection with the publicly-funded portion of the Banks Project with respect to DOT-assisted contracts is _____% (the “DBE Goal”). **[NOTE: DBE PARTICIPATION GOAL TO BE SET BY ODOT WITH RECOMMENDATION FROM THE COUNTY AND THE CITY.]**

The Developer for the Banks Project fully supports the DBE Policy and the DBE Goal for the publicly-funded portion of the Banks Project.

(b) The County and the City will meet the maximum feasible portion of the DBE Goal by using *race-neutral* means to facilitate DBE participation in the Banks Project. The County and the City will attempt to achieve increased DBE participation in DOT-assisted contracts through *race-neutral* means, including, but not limited to, encouraging prime contractors to subcontract portions of the work on the Banks Project to DBEs, including work that such prime contractors otherwise might perform with their own work forces; ensuring the inclusion of DBEs and other small businesses on the County’s and/or the City’s mailing lists for bidders; and advising prime contractors of the County’s website and the City’s website with DBE information. [49 CFR Part 26.51(a)]

(c) The County and the City will use *contract goals* to meet any portion of the DBE Goal that the County and the City project cannot be met using *race-neutral* means. *Contract goals* shall be established so that, over the period to which the overall goal applies, the *contract goals* cumulatively will result in meeting any portion of the DBE Goal that is not projected to be met through the use of *race-neutral* measures. The County and the City will establish *contract goals* only on those DOT-assisted contracts that have subcontracting possibilities. The County and the City will not be required to establish *contract goals* on every such contract, and the size of *contract goals* will be adapted to the circumstances of each such contract (e.g., type and location of work, availability of DBEs to perform the particular type of work, etc.). [49 CFR Parts 26.51(d) and (e)] The County and the City will express *contract goals* as a percentage of the total amount of a DOT-assisted contract.

4.8 Good Faith Efforts. [49 CFR Part 26.53] When the County and/or the City has established a DBE *contract goal*, the County and/or the City will award the contract only to a bidder/offeror who makes good faith efforts to meet the goal as required under 49 CFR Part 26.53. Compliance with good faith efforts requirements will be treated as a matter of responsiveness to bid specifications. Each solicitation for which a *contract goal* has been established will require the bidders/offerors to submit the following information with each bid submitted:

- (a) The names and business and e-mail addresses of DBE firms that will participate in the contract;
- (b) A description of the work that each DBE firm will perform;
- (c) The dollar amount of the participation of each DBE firm participating;

(d) Written and signed documentation of commitment to use DBE subcontractors whose participation it submits to meet a ***contract goal***;

(e) Written and signed confirmation from each DBE firm that it is participating in the contract as provided in the prime Contractor's commitment; and

(f) If the contract goal is not met, evidence of good faith efforts of the bidder/offeror to meet such goal.

4.9 Counting DBE Participation. [49 CFR Part 26.55] The County and the City will count DBE participation towards overall and ***contract goals*** under the DBE Program as provided in 49 CFR Part 26.55.

4.10 DBE Certification. [49 CFR Part 26.83] Only firms certified as eligible DBEs as described in 49 CFR Part 26.83 are eligible to participate in the DBE Program.

5. SBE Policy Statement and Objectives

5.1 Policy and Objectives. The County and the City recognize that small businesses contribute financially to the County and the City through the payment of local taxes and the employment of local residents, who themselves support the County and the City through the payment of local taxes. The County and the City also acknowledge that small businesses generally have an economic and competitive disadvantage with respect to County and City contract and procurement opportunities because of their size and economic status. The County and the City believe that the growth and development of these economically-disadvantaged small businesses will increase the number of qualified business competitors in the local community, will improve and strengthen the local tax base which supports the County and the City, and will have a positive impact on the local workforce. It is the policy of the County and the City to support and encourage the participation of economically-disadvantaged small businesses in their procurement and contracting activities, including such activities related to the Banks Project (the "SBE Policy"). Accordingly, as part of the Banks Inclusion Policy, the County and the City have established the Banks Small Business Program (the "SBE Program") to encourage the participation of small businesses, directly and indirectly, in the contracts and procurements awarded by the County and/or the City related to the Banks Project. As part of the SBE Program, the County and the City also will encourage Contractors awarded Banks Project contracts to engage or use small businesses as subcontractors and/or suppliers for work to be performed under such contracts. Further, the County and the City will collect data to measure the participation of small businesses and minority and women-owned businesses in contracting and procurement activities related to the Banks Project. On an annual basis during the completion of the Banks Project, the County and the City will review this SBE Policy and the SBE Program and, if appropriate, will modify the policy and/or the program to more effectively achieve the objective of including small businesses in the contracting and procurement activities of the County and/or the City relating to the Banks Project.

5.2 Definitions. For purposes of this SBE Policy and the SBE Program, as used herein, “small business”, “small business enterprise” and “SBE” means a “small business enterprise” as defined under Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio, except that any requirement for the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) contained in such definition will not be applicable for purposes of the SBE Program. As used herein, “Contractor” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

5.3. SBE Participation Goals.

(a) In furtherance of the SBE Policy, it is the goal of the County and the City to award to small businesses, directly or indirectly through contracting, subcontracting and/or procurement activities of Contractors, contracts and procurements which represent at least 30% for Construction, 15% for Commodities and General Services and 10% for Professional Services, respectively, of the aggregate dollars spent annually by the County and/or the City on the Banks Project (the “SBE Goal”). In order to achieve the SBE Goal, the County and the City will encourage Contractors to use small businesses in the performance of contracts awarded to them relating to the Banks Project.

The Developer for the Banks Project fully supports the SBE Policy and the SBE Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve percentage goals equal to the SBE Goals with respect to the use of small business enterprises.

(b) The following categories are hereby established to identify the contracting and procurement activities covered by this SBE Policy, which categories may be amended from time to time by the County and the City:

(i) **Category A. – Construction:** including, without limitations, any and all contracts relating to new construction and the construction, renovation and/or maintenance of buildings, facilities and other erected structures owned or leased by the County and/or the City and the rehabilitation, remodeling and repairs of roads and bridges.

(ii) **Category B. – Commodities:** including, without limitations, the purchase of all goods, equipment, office and other supplies, art, furniture, and other tangible personal property otherwise not covered by Categories A, C and D herein.

(iii) **Category C. - General Services:** including, without limitations, the procurement of advertising, printing, non-construction repairs, janitorial services, training seminars and workshops, computer and information systems security, shipping and mailing, microfiche and microfilm, courier, storage, travel, consulting and any other non-professional services.

(iv) **Category D. – Professional Services:** including, without limitations, the purchase of any and all services for which applicable selection criteria may require a bidder or Contractor to possess a license or other certificate of competency, such as in the areas of accounting and auditing, insurance, laboratory, legal, medical and transportation, or as otherwise described as consultants in the Ohio Revised Code.

(c) Each Contractor for the Banks Project will be required to submit to the County and/or the City, as the case may be, with the Contractor's bid a plan for the engagement of small businesses by the Contractor in connection with the Banks Project. A Contractor's failure to submit a small business utilization plan to the County and/or City with the Contractor's bid may result in a determination that the bid is non-responsive and rejection of the bid.

(d) The County and/or the City may establish goals for the utilization of SBEs for each contract awarded by the County or the City, as the case may be, in connection with the Banks Project, and the goal related to each contract may differ from the goals for other contracts because of the availability of SBEs or other factors.

(e) The County and the City are required to award all contracts for the Banks Project to the "**lowest and best**" bidder. Accordingly, inability of a Contractor to meet the established contract goal or any other goal set forth in this SBE Policy with respect to the utilization of SBEs will not exclude the Contractor from award of a contract if the Contractor's bid otherwise is deemed by the County and/or the City, as the case may be, to be the "**lowest and best**" bid.

(f) For purposes of determining whether the SBE Goal is reached, SBE participation in Banks Project contracts will be counted as follows:

(i) The total dollar value of the contract awarded to an eligible SBE will be counted toward the SBE Goal;

(ii) The County or the City may count toward the SBE Goal a portion of the total dollar value of a contract with an eligible joint venture equal to the percentage of the ownership and contract of the SBE in the joint venture;

(iii) The County or the City may count toward the SBE Goal only expenditures to SBEs that perform a "**commercially useful function**" in the work of a contract. An SBE is considered to perform a "**commercially useful function**" when it is responsible for execution of a distinct element of the work of a contract and carrying out its responsibilities by actually performing, managing, and supervising the work involved. A business which stocks sufficient quantities of supplies in direct inventory, held for sale or resale, to cover anticipated future demands for the supplies engages in a "**commercially useful function**" for purposes of the SBE Program. SBEs that engage in the business of providing brokerage shall not be deemed to perform a "**commercially useful function**" unless the brokerage services are those required or sought by the County or the City, as the case may be. To determine whether an SBE is performing a commercially useful function, the County or the City, as the case may be, will evaluate the amount of work subcontracted, industry practices, and other relevant factors; and

(iv) Consistent with normal industry practices, an SBE may enter into subcontracts. If an SBE subcontracts a significantly greater portion of the work of the contract than would be expected on the basis of normal industry practices, the SBE will be presumed not to be performing a commercially useful function. The SBE may present evidence to rebut this presumption to the County or the City, whichever has awarded the relevant contract.

5.4 Program Support. To facilitate the use of small businesses by Contractors, the County and the City, working together with the Consultant (as hereinafter defined), will:

5.4.1 Sponsor and hold pre-bid meetings to inform potential bidders of the SBE Goal and the availability of small businesses to perform work related to or to serve as suppliers for the Banks Project;

5.4.2 Notify small businesses of contracting, subcontracting and procurement opportunities related to the Banks Project directly and by placing notices and specifications related to such opportunities in their respective government bulletins; and, as funding permits, in major local newspapers in general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

5.4.3 Provide copies of bid notices to local trade associations, local small business chambers of commerce, technical assistance agencies and small business contractor associations;

5.4.4 Provide small businesses with information and list of resources relating to insurance, bonding and financing;

5.4.5 Encourage the formation of joint ventures among small businesses and between small businesses and prime Contractors which may provide an opportunity for small businesses to gain experience;

5.4.6 Make copies of specifications and requests for proposals available for review by any prospective bidder;

5.4.7 Conduct outreach events directed to small businesses regarding contracting procedures and specific contracting opportunities related to the Banks Project;

5.4.8 Make available a list of small business resources that may assist with the development and improvement of immediate and long-term business management, recordkeeping and financial and accounting capabilities; and

5.4.9 Develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of small businesses which are certified in accordance with this SBE Policy and which are available to serve as subcontractors and suppliers for the Banks Project, categorized by types of firms to facilitate identifying SBEs with capabilities relevant to a particular specification. Each SBE listing will contain the business name, contact person, mailing and e-mail addresses, phone number, legal structure of the business, and details concerning the SBE's specialty(ies). The directory will be continuously updated and maintained electronically as well as in hard copy. In compiling the directory, the County and the City will seek to identify and certify as many SBEs as possible that have the potential of doing business related to the Banks Project.

5.5 Monitoring SBE Participation.

(a) The County and the City will monitor and track the participation of small businesses in the Banks Project to determine if the SBE Goal is being met and whether Contractors are in compliance with the Non-discrimination Policy. In order to assist the County and the City in that effort, each Contractor for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) with each contract bid related to the Banks Project information regarding any and all small businesses proposed to be used by the Contractor in connection with the performance of the contract, including, but not limited to, a list of the name, business and e-mail addresses and telephone number of, and a brief description of the services to be performed or procurements to be filled (including the amount to be paid for such services or procurements) by, each such small business, which list also shall identify specifically each minority and women-owned business to be utilized in performing the contract if awarded to the Contractor; and

(ii) upon award of a contract related to the Banks Project, compile and deliver to the County and the City *monthly* reports regarding the engagement of small businesses in connection with the Banks Project in

sufficient detail so as to allow the County and the City to monitor and track the participation of small businesses in contract and procurement activities related to the Banks Project, including, but not limited to, a list of the name, business and e-mail addresses, telephone number and federal tax identification number of, and a brief description of the actual services performed or procurements filled by (including the amount paid or to be paid for such services or procurements), each small business during the period covered by the report in connection with the Banks Project contract or procurement awarded to such Contractor. In addition, for monitoring purposes, each such report shall identify specifically each minority and women-owned business included in the list.

(b) A Contractor's non-compliance with the foregoing disclosure or reporting requirements may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

(c) The County and the City at least annually will prepare or cause to be prepared a consolidated report based on a compilation and analysis of the reports submitted by the Developer and other information, if any, provided to the County and the City by Contractors, regarding the use of small businesses for contracts and procurements related to the Banks Project. The report also will discuss the use of minority-owned and women-owned businesses for services and procurements related to the Banks Project to the extent that such information is available to the County and/or the City. The report will be made available promptly to the general public on the County's and the City's websites as well as in hard copy upon request.

5.6 SBE Certification. For purposes of the Banks Project, only small businesses which are certified by the City pursuant to Section 323-1-S of the Municipal Code of the City of Cincinnati, Ohio will be eligible to participate in the SBE Program. Notwithstanding the foregoing, no requirement regarding the maintenance of fixed offices within the geographical boundaries of the County or the City (or any other geographic area) will be required for such certification.

5.7 Limitations. The provisions of this SBE Policy shall not apply to contracts or procurements valued at \$5,000 or less. In addition, the provisions of this SBE Policy shall not apply to the publicly-funded portion of the Banks Project to the extent that applicable federal and/or state laws, regulations or policies prohibit the application of this SBE Policy to such portion.

5.8 Application of Other SBE Policies. This SBE Policy and the SBE Program established pursuant hereto shall be applied to all contracts and procurements of the County and/or the City awarded or to be awarded in connection with the Banks Project in lieu of any other existing small business enterprise policy, program or contracting and procurement requirements of the County and/or the City.

6. Workforce Development Policy Statement and Objective [41 CFR Part 60]

6.1 Policy and Objectives. The County and the City are equal opportunity employers. The County and the City believe that the reduction in unemployment among local residents, particularly minorities and women, constitutes a valid local government purpose. The County and the City also recognize their obligation to use contracting and procurement activities to facilitate the creation of jobs for unemployed and underemployed individuals. In addition, a portion of the Banks Project will be financed by the federal government through DOT, which requires compliance with Executive Order No. 11246, as amended (the “Executive Order”), and regulations promulgated by the U. S. Department of Labor, Office of Federal Contract Compliance Programs (“OFCCP”), under 41 CFR Part 60 (the “DOL Regulations”). The Executive Order prohibits discrimination in employment and requires affirmative action by contractors and subcontractors to ensure equal employment opportunities without regard to race, color, sex, religion and/or national origin in performing non-exempt federally-assisted construction contracts and subcontracts. The Executive Order and the DOL Regulations apply to a construction contractor’s or subcontractor’s employees who are engaged in on-site construction, including those construction employees who work on a non-federally assisted construction site. It is the policy of the County and the City to comply, and to require all Contractors awarded contracts or subcontracts related to the Banks Project to comply, with the Executive Order and the DOL regulations (“Banks Workforce Policy”) to the extent applicable. Therefore, in order to increase the capacity of minorities and women to participate in local construction projects, to promote the employment of minorities and women in connection with the Banks Project and to comply with the Executive Order and the DOL regulations, as part of the Banks Inclusion Policy, the County and the City have established the Banks Workforce Development Program (the “Banks Workforce Program”). Each Contractor working on the publicly-funded portion of the Banks Project shall comply with all applicable provisions of the Executive Order, the DOL Regulations and all other rules, regulations, and relevant orders of the U. S. Secretary of Labor. For purposes of this policy, “**Contractor**” means any bidder, contractor, subcontractor, professional service provider, supplier, vendor or other person doing business with or soliciting business from the County and/or the City relating to the Banks Project, unless the context otherwise requires.

All terms used in this Banks Workforce Policy statement which otherwise are not defined in this statement shall have the respective meanings assigned to them, if any, in the Executive Order and/or the DOL Regulations.

6.2 Required Contract Clauses.

(a) Pursuant to the DOL Regulations, the equal opportunity clause published at 41 CFR Part 60-1.4(b) (the “Equal Opportunity Clause”) is required to be included in, and to be made a part of, all nonexempt federally-assisted construction contracts and subcontracts. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Equal Opportunity Clause in each of its contracts and subcontracts. The Equal Opportunity Clause shall be considered to be part of each contract and subcontract related to the

Banks Project required by the Executive Order or the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contract. [41 CFR Part 60-4.3(a)]

(b) The Standard Federal Equal Employment Opportunity Construction Contract Specifications published at 41 CFR Part 60-4.3(a) (the “Specifications”) are required to be included in, and to be made a part of, all federal and federally-assisted construction contracts in excess of \$10,000 to be performed in geographical areas designated by the Director of OFCCP (the “Director”) pursuant to 41 CFR Part 60-4.6 and in construction subcontracts in excess of \$10,000 necessary in whole or in part to the performance of nonconstruction federal contracts and subcontracts covered under the Executive Order. Each Contractor working on the publicly-funded portion of the Banks Project shall include the Specifications in each of its contracts and subcontracts as may be required under the Executive Order and/or the DOL Regulations. The Specifications shall be considered part of each contract and subcontract required by the DOL Regulations to include such a clause, whether or not such clause is physically incorporated in such contracts. [41 CFR Part 60-4.3(a)]

6.3 Affirmative Action Program. [41 CFR Part 60-1.40] Each nonconstruction Contractor awarded a contract by the County or the City related to the publicly-funded portion of the Banks Project, if the Contractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, shall develop and maintain a written affirmative action program for each of its establishments. Each Contractor awarded a contract or subcontract related to the Banks Project shall require each of its nonconstruction subcontractors, if the nonconstruction subcontractor has 50 or more employees and a federally-assisted contract of \$50,000 or more, or has United States bills of lading which in any 12-month period total, or can reasonably be expected to total, \$50,000 or more, to develop and maintain a written affirmative action program for each of its establishments. An affirmative action program required by this section must comply with applicable DOL Regulations, must be developed within 120 days from the commencement of the awarded Banks Project related contract and must be updated annually. [41 CFR Part 60-1.40(a)] In order to comply with DOL Regulations, an affirmative action program must include the components specified in 41 CFR Parts 60-2.10(b) and 60-2.17, including placement goals for minorities and women. As part of its affirmative action program, a Contractor must conduct a workforce analysis of each job title, determine workforce availability of women and minorities for each job group, and conduct a utilization analysis to determine whether women or minority group persons are "underutilized" in any job group. Based on these analyses, the Contractor shall establish goals to overcome the underutilization of minorities and women and shall make a good faith effort to achieve those goals.

6.4 The Banks Project Workforce Participation Goals. [41 CFR Parts 60-4.3 and 60-4.6]

(a) Under the Executive Order and DOL Regulations, construction Contractors are not required to maintain a written affirmative action program, but must make *good faith efforts* to meet demographic goals related to geographic specific census data for minorities and a *nationwide* goal for women as determined by the Director or his designee. From time to time, the Director issues goals for minorities and women utilization based on appropriate workforce

demographic or other relevant data, which covers construction projects or construction contracts performed in specific geographical areas. The goals for minority and women participation in construction projects are expressed in percentage terms for the covered Contractor's aggregate workforce in *each* construction trade on *all* construction sites. The current percentage goal for the utilization of women established by the Director is 6.9% of work hours and applies to all of a Contractor's construction sites regardless of where the federal or federally-assisted contract is being performed. Minority utilization goals are formulated in terms of work hours performed in a specific Standard Metropolitan Statistical Area ("SMSA") or Economic Area, and the specified goals apply to all of a Contractor's work in the SMSA, both federally-assisted and private construction work. Therefore, the current goals for minorities and women participation in the workforce for the Banks Project as established by the Director are as follows:

	Goal for minority participation in each trade	Goal for women participation in each trade
For Hamilton County:	11.0%	6.9%
For City of Cincinnati:	11.0%	6.9%

It is the aim of the County and the City to achieve the workforce participation goals with respect to the Banks Project as set forth above. In addition, based upon current labor force information, the County and the City have established a combined goal for the participation of minorities and women in the workforce for the Banks Project of 22% (the "Workforce Participation Goals").

The Developer for the Banks Project fully supports this Banks Project workforce policy (the "Banks Workforce Policy") and the Workforce Participation Goals for the publicly-funded portion of the Banks Project and, with respect to the privately-funded portion, it is the goal of the Developer to achieve significant participation of minorities and women as measured in labor hours.

(b) In accordance with the Executive Order and the DOL Regulations, the Workforce Participation Goals apply to a covered Banks Project construction Contractor's total construction workforce in the SMSA, even if some of the Contractor's employees perform work under non-federal or nonfederally-assisted construction contracts or subcontracts and even though such work may occur in geographical areas where the Contractor does not currently work on federal or federally-assisted construction projects. The goals applicable to other construction work performed by a Contractor outside of the SMSA (which includes the County and the City) are the goals established by the Director for those geographic areas where such other construction work is being performed.

6.5 Good Faith Efforts. [41 CFR Part 60-4.3]

(a) In order to achieve the Workforce Participation Goals, construction Contractors working on the publicly-funded portion of the Banks Project are required to use their *good faith efforts* to increase the utilization of minorities and women in the skilled construction trades. Further, pursuant to the Executive Order and DOL Regulations, construction Contractors working on the publicly-funded portion of the Banks Project must take certain action to

demonstrate their *good faith efforts* to achieve the Workforce Participation Goals, including, but not limited to:

6.5.1 Maintaining a work environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work;

6.5.2 Establishing and maintaining current lists of minority and women recruitment sources; providing written notification to minority and women recruitment sources and to community organizations when the Contractor has employment opportunities available; and maintaining a record of the organizations' responses;

6.5.3 Maintaining current files containing the names, residence and e-mail addresses and telephone numbers of each minority or woman off-the-street applicant and minority or woman referral from a union, recruitment source or community organization and of what action was taken with respect to each such individual;

6.5.4 Developing on-the-job training opportunities and/or participating in training programs for the area which expressly include minorities and women, and providing notice of these training opportunities and job programs to recruitment sources, state employment offices and other referral sources compiled by the Contractor as required under DOL Regulations;

6.5.5 Disseminating the Contractor's equal employment opportunity policy to unions and training programs, requesting their cooperation and assistance in meeting equal employment opportunity obligations, and disseminating the Contractor's equal employment opportunity policy by including it in the Contractor's policy manual or collective bargaining agreement, by publicizing it in the Contractor's newspaper, annual report , etc. (if any), by specific review of the policy with all management personnel and with all minority and women employees at least once a year, and by posting the Contractor's equal employment opportunity policy on bulletin boards accessible to all employees at each location where the construction work is performed;

6.5.6 Disseminating the Contractor's equal employment opportunity policy in advertising and in the news media of general circulation (including minority and women news media);

6.5.7 Directing recruitment efforts, both oral and written, to minority, women and community organizations, to schools with minority and female students and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs;

6.5.8 Encouraging current minority and women employees to recruit other minorities and women; and

6.5.9 Documenting and maintaining records of all solicitations of offers for subcontracts from minority and women construction contractors and suppliers, including circulating solicitations to minority and women contractor associations and other business associations.

(b) Although Contractors are required to make *good faith efforts* to meet the Workforce Participation Goals, the goals are neither quotas, set-asides nor a device to achieve proportional representation or equal results. The Workforce Participation Goals are not intended to require a Contractor to hire a person who does not have the qualifications needed to perform the assigned job successfully, to hire an unqualified person in preference to another applicant who is qualified, or to hire a less qualified person in preference to a more qualified person. Rather the goals are used to target and measure the effectiveness of affirmative action efforts to eradicate and prevent barriers to equal employment opportunities related to the Banks Project, and no sanctions will be imposed on a Contractor solely for failure to meet the Workforce Participation Goals.

(c) To promote and facilitate such employment, the County and the City, working together and through the Consultant (as hereinafter defined) and/or the Southwest Ohio Regional Workforce Investment Board (the “SWORWIB”), which is funded jointly by the County and the City, will:

6.5.10 Sponsor and hold pre-bid meetings to inform potential bidders of the Workforce Participation Goals and the availability of qualified minorities and women to work on the Banks Project;

6.5.11 Notify minorities and women of employment opportunities related to the Banks Project by placing notices of such opportunities in their respective government bulletins, on their respective websites and, as funding permits, in major local newspapers of general circulation, local trade and trade association publications, small business enterprise media and other periodicals;

6.5.12 Provide copies of notices of employment opportunities related to the Banks Project to local minority and women trade associations, local minority and women chambers of commerce, technical assistance agencies, employment agencies, community resource organizations and minority and women contractor associations;

6.5.13 Work with various community-based/workforce development programs that provide instruction and training opportunities for minorities and women interested in gaining experience in construction and related fields to establish a job readiness program for, and to increase the pool of minorities and women qualified to work on, the Banks Project;

6.5.14 Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, educational associations, and local community organizations who provide workforce development programs to identify minorities and women interested in pursuing careers or jobs in the construction industry; and

6.5.15 Implement pre-apprenticeship programs to develop the skill levels of minorities and women interested in pursuing jobs in the construction industry.

In addition, working together and through the SWORWIB, the County and the City will use their best efforts to develop and distribute to potential Contractors for the Banks Project through print and electronic means a current directory of qualified minority and women construction and other workers available for employment related to the Banks Project, categorized by types of experience and skills to facilitate identifying minorities and women with skills and capabilities relevant to particular job requirements. To the extent permissible by law, each listing will contain the name, residence and e-mail addresses, telephone number, and details concerning the job qualifications of each individual. The directory will be continuously updated and maintained electronically as well as in hard copy.

(d) The Workforce Participation Goals established herein are interim and designed to be reasonably attainable. The County and the City will review the Workforce Participation Goals at least annually and, if legally permissible and appropriate, based upon the relevant facts and circumstances, from time to time, the County and the City may modify or adjust the Workforce Participation Goals.

6.6 Monitoring the Banks Project Workforce Participation.

(a) The County and the City, working together and through the Consultant, will monitor and track the participation and employment of minorities and women as construction and other workers in connection with the Banks Project to determine if the Workforce Participation Goals are being met. In order to assist the County and the City in that effort, each Contractor awarded a contract for the Banks Project will be required to:

(i) submit to the awarding government entity (the County or the City, as appropriate) promptly after such award information regarding the number of full and part-time employees of the Contractor who will work on the Banks Project, identifying such employees who are minorities and women, including, but not limited to, a list of the name, residence and e-mail addresses, and telephone number of, and a brief general description of the work to be performed by, each such employee, information regarding whether the Contractor expects to hire additional employees to work on the Banks Project and, if so, a brief general description of the skills and capabilities requirements for each such additional employee; and

(ii) compile and deliver to the County and the City *monthly* reports regarding the employment, if any, of additional minorities and women to work on the Banks Project.

(b) A Contractor's non-compliance with the requirements of the Executive Order, the DOL Regulations, this Banks Workforce Policy or the Banks Workforce Program, as

such provisions are applicable with respect to the publicly-funded portion of the Project, may be considered a breach of contract and may result in the suspension or termination of the Contractor's contract related to the Banks Project or such other remedy as may be deemed appropriate by the County and/or the City.

6.7 Limitations. The provisions of this Banks Workforce Policy and the Banks Workforce Program shall not apply to a Contractor with a federally-assisted construction contract or subcontract valued at \$10,000 or less. [40 CFR 60-4.1]

7. Employee Readiness Program

7.1 Establishment. In order to accomplish the Workforce Participation Goals, the County and the City, working together and with the SWORWIB, will cause to be established an employee readiness program (the "ERP") to work in conjunction with various community-based workforce development programs to increase the construction skill levels of County and City residents and to help them reach the qualification levels needed to gain entry into union and open shop apprenticeship programs. Additional details regarding the role and make-up of the ERP are set forth in Schedule A attached. To facilitate this effort, the County and the City, working together and through the Consultant, will:

(a) Coordinate with various community-based workforce development programs that provide instruction and training opportunities for those interested in gaining experience in construction industry and related fields;

(b) Coordinate with local union and non-union pre-apprenticeship programs, career, and technical centers, universities, and educational associations and organizations to identify and engage those interested in pursuing careers in the construction industry and related fields; and

(c) Advertise and promote the availability of workforce project opportunities in a broad-based manner.

7.2 Employee Readiness Committee. The County and the City endorse the work and efforts of the SWORWIB and will encourage the SWORWIB to establish an employee readiness committee (the "ERC") to oversee implementation of the ERP. The purpose of the ERC will be to evaluate the effectiveness of the ERP and new and existing apprenticeship programs which are available to residents of the County and/or the City. The membership of the ERC should include an elected official, Contractors, union and non-union officials, a SWORWIB member, and apprenticeship representatives. The ERC should provide input and recommendations to the SWORWIB and, in turn, the SWORWIB should report quarterly to the County, the City and the Consultant about the progress and effectiveness of the ERP.

8. Inclusion Outreach Consultant

8.1 Engagement of Consultant. In order to facilitate the implementation and administration of this Banks Inclusion Policy, including the DBE Program, the SBE Program and the Banks Workforce Program, the County, the City and the Developer will hire an inclusion outreach consultant (the “Consultant”) to assist with the Banks Project. The Consultant will be responsible for conducting extensive outreach programs directed at DBEs, including minority and women-owned businesses, SBEs, and qualified minorities and women construction workers, during the preconstruction and construction phases of the Banks Project. The Consultant also will be responsible for tracking, monitoring and preparing monthly participation reports on the utilization of DBEs, including minority and women-owned businesses, SBEs and qualified minorities and women construction workers in connection with the Banks Project.

8.2 Other Duties of Consultant. The Consultant will work cooperatively with the Hamilton County Office of Small Business Development (the “Small Business Development Office”), and the City of Cincinnati Office of Contract Compliance (the “COCC”) in connection with the implementation and administration of this Banks Inclusion Policy. In addition, the Consultant will seek input and advice regarding effective outreach efforts as contemplated by this Banks Inclusion Policy from business leaders, DBEs, small business owners and representatives of trade associations and community organizations, including, but not limited to, the Greater Cincinnati & Northern Kentucky African American Chamber of Commerce, the Cincinnati USA Hispanic Chamber of Commerce, the Cincinnati USA Regional Chamber of Commerce, the Greater Cincinnati Building & Construction Trades Council, Allied Construction Industries (ACI), Ohio Valley Chapter of Associated Builders and Contractors, Inc., South Central Ohio Minority Business Council, Cincinnati Women In Construction, Cincinnati Business Incubator, the Cincinnati Minority Contractors Business Assistance Program, the Cincinnati-Hamilton County Community Action Agency, the Cincinnati Unit of the NAACP, the Hamilton County Department of Job and Family Services and the Cincinnati Workforce Development Center.

9. Socio-Economic Impact

9.1 Data Collection and Analysis. The County and the City anticipate that the Banks Project will have a significant and positive social and economic impact on the Greater Cincinnati and Hamilton County region. The County and the City also believe that it is important to measure such impact, particularly in the census tract areas within the SMSA that includes the County and the City (the “Hamilton County SMSA”) which have been deemed to be economically distressed. For that purpose, the County and the City will collect and analyze social and economic data to monitor and measure the regional impact of the Banks Project. To assist the County and the City and to facilitate such efforts, each Contractor for the Banks Project will be required to:

(a) prepare and submit to the awarding government entity (the County or the City, as appropriate) quarterly reports regarding:

(i) the use of first-tier subcontractors, suppliers and vendors in connection with the Banks Project during the period covered by the report, including, but not limited to, (i) the name and principal business address of each subcontractor, supplier and vendor and (ii) the dollar value of each Banks Project related subcontract and procurement awarded by the Contractor to the first-tier subcontractor, supplier or vendor during the covered period; and

(ii) the number of persons employed by the Contractor to work on the Banks Project (or to perform any work directly or indirectly related to the Banks Project) during the covered period who reside in the SMSA which includes Hamilton County, together with the aggregate amount of salaries and gross wages paid to such persons, based upon each zip code included in such geographic area.

Each Banks Project related subcontract between a Contractor and a first-tier subcontractor, supplier or vendor shall require the subcontractor, supplier or vendor to prepare and submit to the government entity that awarded the prime contract or procurement to the Contractor (the County or the City, as appropriate) quarterly reports containing information as described or otherwise required pursuant to this provision with respect to the subcontractor's first-tier subcontractor supplier or vendor contract, procurement and/or employment activities related to such awarded subcontract or procurement.

9.2 Limitations. The provisions of Section 9.01 shall not apply to individual Banks Project related contracts, subcontracts and/or procurements valued at \$10,000 or less, unless or until the aggregate value of a series of such contracts, subcontracts and/or procurements awarded to the same Contractor, subcontractor, supplier or vendor exceeds \$10,000. The information described under Section 9.01(a)(ii) shall not be required for a supplier or vendor that does not have any office, supply warehouse or distribution facility located within [50] miles of the County.

10. Rules and Guidelines

10.1 Authorization. The Small Business Development Office and the COCC are authorized to jointly prepare and issue rules and guidelines for the implementation and administration of this Banks Inclusion Policy consistent with the purposes and intent of such policy as set forth herein. Nothing set forth herein or in such rules and guidelines should be interpreted or applied in any manner that would be in violation of existing applicable state or federal law. [Accordingly, the Banks Project Small Business Enterprise Program Rules and Guidelines dated _____, 2007 have been developed by the Small Business Development Office and the COCC and specifically apply to this Banks Inclusion Policy.]

SCHEDULE A

Employee Readiness Program

[TO BE ATTACHED]

The Banks - Phase 3B Public Infrastructure Development Parking Garage And Street Grid

Monthly Workforce Tracking Form

Contractor Name:		Contract Value:		Trade Contract #:		Pay Application #:	
Date Submitted:		Business Type: (Circle all that apply)		SBE *BSBE MBE WBE DBE NONE			
Contact Person:		Reporting Dates:		From: To:			
Address:		Federal Tax ID Number:					
City/State/Zip Code:		County:					
Telephone Number:		Email:					
Trade Contract Description:		Circle Appropriate Box:		Contractor		Subcontractor	

The Banks Monthly Workforce

[illegible]

Authorized Contractor Representative Signature:	Title:	Date:
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The Banks - Public Infrastructure Development Parking Garage and Street Grid

Instructions Form WF-01

WF-01 Number of Employee Hours Report

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Business Status:	Indicate the Contractor's business status. Circle all which apply (if applicable)
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zipcode:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractors designated contact person
Trade Contract Description:	Indicate the description of the Contractor's work on this project
Job Category Trade Employees:	Indicate the job category of the trade employees working on the project
Total Employee Hours Worked:	Indicate the total number of employees hours worked for the time period covered by this report
Total Minority/Female Hours:	Indicate the total number of hours worked by minority and female employees for the period covered by this report
Caucasian Hours:	Indicate the total number of employees hours worked for Caucasian employees
African American Hours:	Indicate the total number of employees hours worked for African American employees
Asian American Hours:	Indicate the total number of employees hours worked for Asian American employees
Hispanic American Hours:	Indicate the total number of employees hours worked for Hispanic American employees
Native American Hours:	Indicate the total number of employees hours worked for Native American employees
Male/Female:	Indicate the number or % of male or female employees for the time period covered by this report
Foreperson:	Indicate the number of employees identified as Foreperson's working on this project
Equipment Operators:	Indicate the number of employees identified as Equipment Operators working on this project
Mechanics:	Indicate the number of employees identified as Mechanics working on this project
Truck Drivers:	Indicate the number of employees identified as Truck Drivers working on this project
Ironworkers:	Indicate the number of employees identified as Ironworkers working on this project
Carpenters:	Indicate the number of employees identified as Carpenters working on this project
Cement Mason(and Concrete Finishers):	Indicate the number of employees identified as Cement Masons(and Concrete Finishers) working on this project
Electricians:	Indicate the number of employees identified as Electricians working on this project
Pipefitter/Plumber:	Indicate the number of employees identified as Pipefitters/Plumbers working on this project
Painters:	Indicate the number of employees identified as Painters working on this project
Laborer-Semi Skilled:	Indicate the number of employees identified as Laborers-Semi Skilled working on this project
Laborers -Unskilled:	Indicate the number of employees identified as Laborers-Unskilled working on this project
Grand Totals:	Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

FOREPERSON - Directly supervise and coordinate activities of construction. (Sample: Construction Foreman, Construction Superintendent, Construction Supervisor, Field Supervisor, Foreman, Job Superintendent, Project Superintendent, Site Superintendent, Superintendent, Supervisor)

EQUIPMENT OPERATORS - Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.) Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators and stone spreader operators. (Sample: Equipment Operator (EO), Paver Operator, Roller Operator, Truck Driver, Operator, Screed Operator, Heavy Equipment Operator, Maintenance Equipment Operator (MEO), Asphalt Raker, Asphalt Paver Operator.)

MECHANICS - Operate on one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. (Sample: Back Hoe Operator, Engineering Equipment Operator, Equipment Operator, Heavy Equipment Operator, Loader Operator, Machine Operator, Motor Grader Operator, Operating Engineer, Operator, Track Hoe Operator.)

TRUCK DRIVERS – Heavy and Tractor-Trailer Truck Drivers - Drive a tractor trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license. (Sample: Truck Driver, Driver, Over the Road Driver (OTR Driver), Line Haul Driver, Delivery Driver, Owner Operator, Road Driver, Semi Truck Driver, City Driver, Feeder Driver)

IRONWORKERS - Structural Iron and Steel Workers - Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings. (Sample: Ironworker, Iron Worker, Fitter / Welder, Steel Fabricator, Steel Worker, Structural Steel Erector, Tower Hand) Reinforcing Iron and Rebar Workers - Position and secure steel bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches and hand tools. Includes rod busters. (Sample: Ironworker, Rod Buster, Iron Worker, Steel Tier, Field Ironworker, Reinforced Ironworker, Rodman)

CARPENTERS - Construct, erect, install, or repair structures and fixtures made of wood, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors. May also install cabinets, siding, drywall and batt or roll insulation. Includes brattice builders who build doors or brattices (ventilation walls or partitions) in underground passageways. Construction Carpenters - Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools. (Sample: Carpenter, Lead Carpenter, Assembler, Finish Carpenter, Construction Worker, Custom Stair Builder, Installer, Production Worker, Trim Carpenter, Concrete Carpenter) Rough Carpenters - Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions. (Sample: Carpenter, Apprentice Carpenter, Form Carpenter, Journeyman Carpenter, Rough Carpenter, Union Carpenter, Bridge Carpenter, Bridge Repair Crew Person)

CEMENT MASON(and Concrete Finishers) - Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; and use saws to cut expansion joints. (Sample: Concrete Finisher, Cement Finisher, Cement Mason, Finisher, Mason, Concrete Mason.)

ELECTRICIANS - Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. (Sample: Chief Electrician; Control Electrician; Electrician; Industrial Electrician; Inside Wireman; Journeyman Electrician; Journeyman Wireman; Maintenance Electrician; Mechanical Trades Specialist, Electrician; Qualified Craft Worker, Electrician (QCW, Electrician)

PIPEFITTER/PLUMBER- Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinkler fitters. (Sample: Pipe Fitter, Pipefitter, Welder, Steamfitter, Sprinkler Fitter, Equipment Service Associate (ESA), Machine Repairman, Journeyman Pipefitter, Millwright, Pipe Welder.) Assemble, install, or repair pipes, fittings, or fixtures of heating, water, or drainage systems, according to specifications or plumbing codes. (Sample: Commercial Plumber; Drain Cleaner, Plumber; Drain Technician; Journeyman Plumber; Master Plumber; Plumber; Plumber Gasfitter; Plumbing and Heating Mechanic; Residential Plumber; Service Plumber)

PAINTERS - Paint walls, equipment, buildings, bridges, and other structural surfaces, using brushes, rollers, and spray guns. May remove old paint to prepare surface prior to painting. May mix colors or oils to obtain desired color or consistency. (Sample: Painter, Facilities Painter, Maintenance Painter, Highway Painter, Industrial Painter)

LABORERS-SEMI SKILLED – Having or requiring more training and skill than unskilled labor but less than skilled. Perform tasks involving physical labor at construction sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris and other waste materials. May assist other craft workers. (Sample: Construction Laborer, Construction Worker, Curb and Gutter Laborer, Drain Layer, Drop Crew Laborer, Helper, Laborer, Post Framer, Skill Labor, Union Laborer)

LABORERS UNSKILLED – All non-classified laborers. Any miscellaneous job classifications are to be incorporated in the most appropriate category listed on the form. All employees on the project should be accounted for.

The Banks - Phase 3B Public Infrastructure Development Parking Garage and Street Grid

Number of Employees Report

Contractor Name:		Contract Value \$:			
Date Submitted:		Reporting Dates:	From:		To:
Contact Person:		Pay Application #:			
Address:		County:			
City/State/Zip Code:		Business Type:			
Telephone Number:		Federal Tax ID:			
Trade Contract Description:		Contact Email:			

Number of Employees

	Total Number of Employees	Caucasian Men		Women		Minority		Caucasian		African American		Asian American		Hispanic American		Native American	
Joint Policy Questions		Total Number of Caucasian Men	Percentage of Total Employees	Total Number of Women	Percentage of Total Employees	Total Number of Minority Men and/or Women	Percentage of Total Employees	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Total number of employees working on this Banks contract?	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of full-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of part-time employees working on Banks contract [6.6 (a) (1)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of employees working on Banks contractor (who perform work directly or indirectly) who lives in the Cincinnati Middletown MSA [9.1 (a) (ii)]	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0
Total number of all employees working within this MSA (All employees in company)	0	0	0.00%	0	0.00%	0	0.00%	0	0	0	0	0	0	0	0	0	0

****Note minority female workers count in both the women and minority columns but only once in the total number of employees column.**

Do you expect to hire additional employees to work on The Banks Project?

YES

NO

If so, please provide a general description of the skills and capability requirements for each additional employee

Authorized Contractor Representative:

Signature

Title

Date

The Banks - Public Infrastructure Development Parking Garage and Street Grid

Instructions Form WF-02

WF-02 Monthly Workforce Tracking Form

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zip code:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractors designated contact person
Total # of Employees:	Indicate the total number of participants who worked on this contract
Total # of Caucasian Men:	Indicate the total participation of Caucasian men working on this contract
Total Percent of Caucasian Men:	Indicate the total percentage of Caucasian men working on this contract
Total # of Women:	Indicate the total participation of females working on this contract
Total Percent of Women:	Indicate the total percentage of females working on this contract
Total # of Minorities:	Indicate the total participation of minorities working on this contract
Total Percent of Minorities:	Indicate the total percentage of minorities working on this contract
Caucasian Men :	Indicate the total number of Caucasian men working on this contract
Caucasian Women :	Indicate the total number of Caucasian women working on this contract
African American Men:	Indicate the total number of African American men working on this contract
African American Women:	Indicate the total number of African American women working on this contract
Asian American Men:	Indicate the total number of Asian American men working on this contract
Asian American Women:	Indicate the total number of Asian American women working on this contract
Hispanic American Men:	Indicate the total number of Hispanic American men working on this contract
Hispanic American Women:	Indicate the total number of Hispanic American women working on this contract
Native American Men:	Indicate the total number of Native American men working on this contract
Native American Women:	Indicate the total number of Native American women working on this contract
Total # Minority and/or Women:	Indicate the combined total of minorities and women working on this contract
Percentage of Total Employees:	Indicate the combined percentage of minorities and women working on this contract
Grand Totals:	Indicate the total of employee hours work for the identified categories for the timeframe covered by this report
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

The Banks - Public Infrastructure Development Parking Garage and Street Grid											
Monthly Subcontractor Utilization Report											
Contractor Name:						Type of Inclusion Program:	SBE or DBE				
Date Submitted:						Contractor Pay Application #:					
Contact Person:						Reporting Period From:		To:			
Contractor Address:						Business Type: (Circle all that apply)	*Banks SBE SBE MBE WBE **DBE None				
Contractor City/State/Zip Code:						County:					
Telephone Number:						Federal Tax ID:					
Trade Contract Description:						Email Address:					
Employee Information Form											
Employee Name	Minority		Female		Full or Part Time		Home Address	Last 4 digits of Social Security #	Minority Classification	County	Job Trade Category
	(Circle Y or N)		(Circle Y or N)		(Circle FT or PT)						
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					
	Y	N	Y	N	FT	PT					

*The Banks SBE - An SBE certified by the City of Cincinnati Economic Inclusion

**The Banks DBE - A DBE certified through the Ohio DBE Unified Certification Program

***Column should reflect the information entered on form AIA Document G703 column E

The undersigned certifies that the information recorded above is correct, and that each of the representations set forth above is true. The undersigned further acknowledges that any misrepresentation hereon may result in termination of contract and/or prosecution under applicable Federal and State laws concerning false statements and false claims.

Authorized Contractor Representative:

Signature

Title

Date

**The Banks - Public Infrastructure Development Parking Garage and Street Grid
Instructions Form WF-03**

WF-03 Monthly Employee Report

Contractor Name:	Indicate Contractor's official name
Contract Value \$:	Indicate the approved Contract Value in dollars
Contract #:	Indicate the contract number for this contract
Project #:	Indicate the project number for this contract
Date Submitted:	Indicate the date the form is submitted
Reporting Dates:	Indicate the time period covered by this report (from date and to date)
Contact Person:	Indicate the Contractor's contact person responsible for completing this form
Business Type:	Indicate the Contractor's business status. Circle all which apply (if applicable)
Contractor Address:	Indicate the address of the contractor submitting the form
Federal Tax ID (FTID) Number:	Indicate the Federal Tax Identification or Social Security Number of the Contractor submitting the form
City/State/Zipcode:	Indicate the City, State and Zip Code of the Contractor's business location
County:	Indicate the County of the Contractor's business location
Telephone Number:	Indicate the telephone number of the Contractor's designated contact person
Email:	Indicate the email of the Contractor's designated contact person
Trade Contract Description:	Indicate the description of the Contractor's work on this project
Employee Name:	Indicate the name of employee working on this project
Minority:	Indicate whether the employee belongs to an ethnic minority group - Circle Response - Yes or No
Female:	Indicate whether the employee is female of any ethnic group - Circle Response - Yes or No
Full/Part Time:	Indicate whether the employee is working in a full time or part time capacity - Circle Response - FT or PT
Home Address:	Indicate the home address of the employee
Last 4 Digits of Employee Social Security #:	Indicate the last 4 social security numbers of the employee
Minority Classification:	Indicate the minority classification of the employee (if applicable)
County:	Indicate the county of the employee
Job Category Trade Employees:	Indicate the job category of the trade employees working on the project
Contractor Representative Signature:	Indicate the signature of the Contractor's authorized representative
Title:	Indicate the title of the Contractor's authorized representative
Date:	Indicate the date of the Contractor's authorized representative sign the form

*Job Trade Category Definitions are attached

Consolidated Metropolitan Statistical Area (CMSA) OH-KY-IN

40006	40011	40045	40055	40075	40355	40359	40363	40379	41001
41003	41005	41005	41006	41007	41008	41010	41011	41012	41014
41017	41018	41019	41021	41025	41030	41033	41034	41035	41040
41043	41044	41045	41046	41051	41052	41053	41054	41055	41056
41062	41063	41071	41072	41073	41074	41075	41076	41083	41085
41086	41092	41094	41095	41096	41097	41098	41099	45001	45002
45003	45004	45005	45011	45012	45013	45014	45015	45018	45030
45032	45033	45034	45036	45039	45040	45041	45042	45044	45050
45051	45052	45053	45054	45055	45056	45061	45062	45063	45064
45065	45066	45067	45068	45069	45071	45101	45102	45103	45105
45106	45107	45111	45112	45113	45114	45115	45118	45119	45120
45121	45122	45123	45130	45131	45132	45133	45135	45140	45142
45144	45146	45147	45148	45150	45152	45153	45154	45155	45156
45157	45158	45159	45160	45162	45164	45166	45167	45168	45169
45171	45172	45174	45176	45177	45201	45202	45203	45204	45205
45206	45207	45208	45209	45211	45212	45213	45214	45215	45216
45217	45218	45219	45220	45221	45222	45223	45224	45225	45226
45227	45229	45230	45231	45232	45233	45234	45235	45236	45237
45238	45239	45239	45240	45241	45242	45243	45244	45245	45246
45247	45248	45249	45250	45251	45252	45253	45254	45255	45258
45262	45263	45264	45267	45268	45269	45270	45271	45273	45274
45275	45277	45280	45296	45298	45299	45335	45458	45612	45616
45618	45650	45657	45660	45671	45679	45684	45693	45697	45999
47001	47003	47006	47010	47011	47012	47016	47018	47019	47020
47021	47023	47024	47030	47031	47033	47034	47035	47036	47037
47038	47039	47040	47041	47042	47043	47060	47224	47250	47325
47331	47353	47357							

SECTION 008270
Responsible Bidder Requirements

PART I - GENERAL

Contractors shall be required to satisfy all of the following pre-award responsibilities and agree to all of the following provisions which will be incorporated in the contracts for construction projects within the Banks Development. The City of Cincinnati (“City”) and the Board of County Commissioners of Hamilton County, Ohio (the “County”) (hereinafter the City and the County shall be collectively referred to as the “Public Parties”) believe that these requirements are reasonably related to the successful performance of the Banks Development projects. These requirements shall also be set forth and integrated with the Bid Package Conditions.

1. Each bidder shall certify that it will require all contractors who bid or perform any work pursuant to the contract on which the bidder is bidding to satisfy all of these Responsible Bidder Requirements.
2. Each bidder shall certify that it will pay prevailing wages, in amounts determined according to Ohio’s Prevailing Wage Law, R.C. 4115.03 through 4115.16, and O.A.C. 4101:9-4-01 through 4101:9-4-31, on all construction projects that are part of the Banks Development, except as otherwise provided herein. Notwithstanding the foregoing provision, the payment of prevailing wages shall not be required with respect to leasehold and/or tenant improvements and/or the fit out of interior spaces of the office, retail and condominium elements of the Banks Project.
3. As a condition precedent to the award of a contract or subcontract of Two Hundred and Fifty Thousand Dollars (\$250,000) or more, the Public Parties may require the lowest bidder to engage in a review of the constructability and scope of the bid to verify that the contractor included all required work.
4. If the bid of the lowest bidder is more than twenty percent (20%) below the bid of the next lowest bidder, the Public Parties may request that the lowest bidder identify three (3) construction projects that it has successfully completed within the five (5) years before the submission of the bid. This information may be provided in the post-bid scope review to the Public Parties.
5. Each bidder shall certify that it will employ supervisory personnel on the project that (a) are qualified to perform in such supervisory capacity and (b) have any license or licenses required by applicable law to perform in such capacity.

6. Each bidder shall certify that it is not currently debarred from performing state or federal construction contracts (after all appeals), because of a violation of Fair Labor Standards Act and/or any state or federal prevailing wage law. Each bidder shall provide a list of every occasion on which it has been debarred from performing local, state or federal construction contracts (after all appeals), because of a violation of the Fair Labor Standards Act and/or any state of federal prevailing wage law, during the last ten years.
7. Each bidder shall certify that it, as well as each subcontractor it will utilize on the Project has implemented an OSHA-compliant Safety Program which includes: a) with respect to all supervisors, completion of OSHA's thirty (30) hour safety course; b) with respect to all field employees, completion of OSHA's ten (10) hour safety program. Each bidder shall provide evidence of implementation of an OSHA compliant safety program as set forth herein.
8. Each bidder shall certify that it has implemented a substance-abuse policy and that it is in compliance with Ohio's Drug Free Workplace Requirements; bidders will provide evidence of implementation of such policies upon written request of the Public Parties.
9. Each bidder shall certify that it has all licenses required by applicable state law and regulation to perform work required herein.
10. Each bidder shall list any professional license or licenses that have been revoked by Ohio or revoked by any other state within five (5) years prior to the date of the contractor's bid.
11. Each bidder shall certify that it has no final judgments against it which are not secured by payment bond or other surety at the time of award which are equal to or exceed fifty percent (50%) of the contractor's net work.
12. Each bidder shall certify that it has complied with applicable unemployment and workers compensation laws for at least two (2) years preceding the date of bid submittal.
13. Each bidder shall certify that with respect to each a prime trade contract (e.g., plumbing, HVAC, electrical and fire safety) it will not subcontract more than seventy-five percent (75%) of the bid amount for that prime trade contract. A bidder may apply for a waiver of the foregoing requirement by the Public Parties, which waiver shall be subject to the review and approval of the Public Parties.
14. Each bidder shall certify that it does not have an Experience Modification Rating of more than 1.3 (a penalty rated employer) with respect to the Ohio Bureau of Workers' Compensation risk assessment rating.

15. Each bidder shall certify that it will have in place a meaningful Health Care Medical Plan, and provide, as part of its responsibility review, evidence of a Health Care Medical Plan list of eligible employees and the bidder's share of the cost for those employees working on the Banks' Project. Notwithstanding the foregoing, a bidder with gross revenues of two million dollars (\$2.0M) or less in any of the preceding three years shall be exempted from providing a Health Care Medical Plan as set forth herein. However, any such bidder exempted from this requirement shall certify that it will comply with the applicable prevailing wage requirements with respect to medical insurance.
16. Each bidder shall certify that it will have a meaningful pension or retirement program for its employees and provide, as part of its responsibility review, evidence that it contributes, on a regular basis to an employee pension or retirement program for its field employees and the list of employees for the employees with such coverage. Notwithstanding the foregoing, a bidder with gross revenues of two million dollars (\$2.0M) or less in any of the preceding three years shall be exempted from providing a pension or retirement program as set forth herein. However, a bidder exempted from this requirement shall certify that it will comply with the applicable prevailing wage requirements with respect to a pension or retirement program.
17. Each bidder shall certify that it shall employ field employees on this project that will meet at least one of the following criteria:
- a. Completion of a state or federally approved apprenticeship program in the skilled trade craft such employee is performing a journeyman; or
 - b. Worked as a skilled trade person for at least three (3) years in the craft; or
 - c. Currently enrolled in a state or federally approved apprenticeship program for the craft; or
 - d. Completed the City/County Banks Employee Readiness Program.
- A bidder may request a waiver from the Public Parties of the foregoing requirements with respect to a field employee or a particular position. In requesting such waiver, a bidder shall be required to provide documentation of the skills and experience of such employee or the applicable position which form the basis for such request. Any waiver or the foregoing requirements shall be subject to the review and approval of the Public Parties.
18. Each bidder shall certify that it is not debarred from bidding on the construction project contract in question.
19. A bidder's falsification of any of the certifications herein or failure to comply with the requirements set forth herein, shall be the basis for a default termination of the contract.

PART 1 PRODUCTS

THE BANKS Phase 3B
Public Infrastructure Development -Parking Garage
and Streetgrid Bid Package No. 6- February 21, 2020

Not used.

PART 2 EXECUTION

Not used.

END OF SECTION

THE BANKS
PUBLIC INFRASTRUCTURE DEVELOPMENT
PHASE 3B LOT 23/27 GARAGE & RACE STREET TURNAROUND
BID PACKAGE NO. 6: LOT 23 PARK, LOT 23/27 GARAGE SIGNAGE & SECURITY
FEBRUARY 21, 2020

SECTION 009000
CONTRACT CONSTRUCTION MANAGEMENT FORMS

PART 1 GENERAL

1.1 SUMMARY

- A. The following documents, referred to in the General Conditions, are available from the Construction Manager upon request:
1. Change Order Form (AIA G701/CMA – as amended & modified)
 2. Application and Certificate for Payment (AIA G702/CMA – as amended & modified)
 3. Continuation Sheet (AIA G703/CMA – as amended & modified)
 4. Certificate of Substantial Completion (AIA G704/CMA – as amended & modified)
 5. Contractor's Affidavit of Payment of Debts and Claims (AIA G706/CMA – as amended & modified)
 6. Contractor's Affidavit of Release of Liens (AIA G706A/CMA – as amended & modified)
 7. Consent of Surety to Final Payment (AIA G707 – as amended & modified)
 8. Contractor's Affidavit
 9. Sub-Contractor Affidavit And Waiver Of Lien
 10. Construction Change Directive Form (AIA G714/CMA – as amended & modified)

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

**AIA**[®]**Document G701/CMa[™] – 1992****Change Order - Construction Manager-Adviser Edition****PROJECT (Name and address):**

The Banks-Phase 3B
Public Infrastructure Development- Garage & Race
Street Turnaround
Bid Package No. 6 - February 21, 2020: Lot 23 Park, Lot
23/27 Garage Signage and Security

CHANGE ORDER NUMBER:**INITIATION DATE:**OWNER: ☐CONSTRUCTION MANAGER: ☐ARCHITECT: ☐CONTRACTOR: ☐FIELD: ☐OTHER: ☐**TO CONTRACTOR (Name and address):****PROJECT NUMBERS:** /**CONTRACT DATE:****CONTRACT FOR:****THE CONTRACT IS CHANGED AS FOLLOWS:**

The original Contract Sum was

\$ 0.00

Net change by previously authorized Change Orders

\$ 0.00

The Contract Sum prior to this Change Order was

\$ 0.00

The Contract Sum will be increased by this Change Order in the amount of

\$ 0.00

The new Contract Sum including this Change Order will be

\$ 0.00

The Contract Time will be increased by Zero (0) days.

The date of Substantial Completion as of the date of this Change Order therefore is .

NOTE: This summary does not reflect changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE OWNER, CONSTRUCTION MANAGER, ARCHITECT AND CONTRACTOR.**CONSTRUCTION MANAGER (Firm name)****ARCHITECT (Firm name)****ADDRESS****ADDRESS****BY (Signature)****BY (Signature)****(Typed name)****DATE:****(Typed name)****DATE:****CONTRACTOR (Firm name)****OWNER (Firm name)****ADDRESS****ADDRESS****BY (Signature)****BY (Signature)****(Typed name)****DATE:****(Typed name)****DATE:**



AIA[®] Document G704[™] – 2000

Certificate of Substantial Completion

PROJECT:

(Name and address)

The Banks-Phase 3B: Public Infrastructure Development -
Garage & Race Street Turnaround
Bid Package No. 6 - February 21, 2020: Lot 23 Park, Lot
23/27 Garage Signage and Security

PROJECT NUMBER:

CONTRACT FOR:

CONTRACT DATE:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

FIELD: ☐

OTHER: ☐

TO OWNER:

(Name and address)

Board of County Commissioners,
Hamilton County, Ohio
603 County Administration
Building
138 East Court Street
Cincinnati, Ohio 45202

TO CONTRACTOR:

(Name and address)

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty
Date of Commencement

ARCHITECT

BY

DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: \$0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

CONTRACTOR

BY

DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at _____ (time) on _____ (date).

OWNER

BY

DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

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User Notes:

(3B9ADA63)



AIA[®] Document G705[™] – 2001

List of Subcontractors

PROJECT: *(Name and address)*

The Banks-Phase 3B

Public Infrastructure Development - Garage & Race Street
Turnaround

Bid Package No. 6 - February 21, 2020: Lot 23 Park, Lot
23/27 Garage Signage and Security

DATE:

TO ARCHITECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

FROM CONTRACTOR: *(Name and address)*

CONTRACTOR'S PROJECT NUMBER:

(List Subcontractors and others proposed to be employed on the above Project as required by the bidding documents.)

Work/Firm Name

Address/Phone

Superintendent



AIA[®] Document G707[™] – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*

The Banks-Phase 3B: Public Infrastructure Development -
Garage & Race Street Turnaround
Bid Package No. 6-February 21, 2020: Lot 23 Park, Lot
23/27 Garage Signage and Security

ARCHITECT'S PROJECT NUMBER:

OWNER: ☐

ARCHITECT: ☐

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

CONTRACT FOR:

CONTRACT DATED:

TO OWNER: *(Name and address)*

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
(Insert name and address of Surety)

on bond of
(Insert name and address of Contractor)

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall
not relieve the Surety of any of its obligations to
(Insert name and address of Owner)

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:
(Insert in writing the month followed by the numeric date and year.)

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:

(Seal):

SECTION 011100
SUMMARY OF WORK

PART 1 GENERAL

1.01 GENERAL PROVISIONS OF BID PACKAGE #6 TRADE CONTRACTS

- A.** The following summary is a description of work for all Contract Descriptions for THE BANKS – PHASE 3B, PUBLIC INFRASTRUCTURE DEVELOPMENT, PARKING GARAGE AND STREETGRID. Work related to the Project is as indicated on the Drawings and Specifications as prepared by THP Limited, Inc. This section describes and assigns work to each Contract as designated by the Construction Manager. Each Contractor shall cooperate and coordinate with all other Contractors for proper and expedient completion of the work in this Project. Each Contract Description identifies the major portions of Scope of Work to be performed by the Bidder in specific Contract Descriptions. This summary should in no way be construed as being all-inclusive. It is issued as a guide to aid in the assignment of work. Refer to the Drawings and Specifications for a detailed accounting of any work not explicitly specified or noted. Each Trade Contract Description lists specification sections included, in whole or in part, in that Contract Description. All work activities not explicitly specified or noted, but required to complete the work included in a Contract Description are a part of the work scope.

PART 2 TRADE CONTRACT DESCRIPTIONS

2.1 SECTION INCLUDES:

1. List of Trade Contracts
2. General Provisions of Bid Package #6 Trade Contracts
3. Contract Descriptions

2.2 LIST OF TRADE CONTRACTS

1. List of Bid Package #6 Trade Contracts:

TC-09	Lot 23 Park
TC-10	General Trades, Security, and Signage

2. General Provisions of Bid Package #6 Trade Contracts

- A. Each Contractor shall be responsible for the proper protection of adjacent structures and public rights of way.
- B. Prospective bidders are reminded that all of the contracts described herein contain specific Joint Policy for Small Business Enterprise, Economic Inclusion and Workforce Development for the Banks Project requirements.
- C. Each Trade Contractor shall comply with the Responsible Bidder Requirements specified in section 001000 and herein.
- D. All work is to comply with the rules and regulations of governing authorities having jurisdiction. Work shall be performed by skilled tradesmen having experience in performing the work.
- E. Storage of all materials is limited and must be approved by the Construction Manager. Offsite storage of material may be required. All costs associated with material delivery in small quantities, relocation of materials that impede work progress, and off site material storage must be included in the bid.
- F. A 48-HOUR NOTICE MUST BE GIVEN FOR DELIVERIES. IF NOTICE WAS NOT GIVEN DELIVERIES MAY BE TURNED AWAY. ALL COST ASSOCIATED WITH THIS ACTION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL DELIVERIES MUST BE COORDINATED & APPROVED BY THE CONSTRUCTION MANAGER. NO PARKING BY EMPLOYEES OR DELIVERY VEHICLES IS PERMITTED ON SITE. STORAGE, TOOL OR OFFICE TRAILERS WILL NOT BE PERMITTED ON SITE WITHOUT THE PRIOR APPROVAL OF, AND IN COORDINATION WITH, THE CONSTRUCTION MANAGER.
- G. Each Contractor is responsible to review the site and be familiar with all existing conditions within and around the building including local conditions and requirements. The impact of the site conditions on the cost of performing the work shall be included in the bid. Contractors shall notify the Construction Manager in writing of any discrepancies or conditions detrimental to proper performance of the Work.
- I. Each Contractor to provide to all other trades information and materials, shop drawings, diagrams, templates, and embedments necessary for the coordination of the Work. It is each Contractor's responsibility to field verify and coordinate all interface with other trades.

- J. Where new work connects with existing, do all necessary cutting and patching required to make a satisfactory connection with the work to be performed under the Contract Documents so as to leave the entire work in a finished and workmanlike condition. This requirement shall include all required work where new items connect, fit, or otherwise interface with existing surfaces. Provide all labor and materials to this end, whether or not shown or specified. Verify and match existing conditions. This shall include full block replacement to nearest construction expansion joint of any concrete pavement removed or damaged.
- K. Each Contractor shall at all times maintain a clean and safe passage to all areas of the site, and for the public around the site.
- L. Each Contractor shall field verify all dimensions, materials and conditions of the existing site.
- M. Initial benchmarks and control lines will be provided by the Construction Manager. Each Contractor is responsible for all detailed layout and grade from the indicated benchmark and control points.
- N. Each Contractor is to coordinate all work with the work of other trades for proper function and sequence to avoid construction delays or additional cost.
- O. Each Contractor is responsible for daily cleanup and disposal of all debris associated with its work activities. This shall include removal of debris from public property and/or roadways caused by work on site or carried outside of the site by vehicles employed by the Contractor. Street cleaning of this debris is expected by each Contractor, as necessary. Debris not removed by the Contractors will be discarded at the delinquent Contractor's expense. All areas of work are to be broom cleaned at the end of each work day. In addition to daily cleanup each Trade Contractor to provide 1 person for every 4 Trade Contractor employee and their subs to a once a week jobsite general cleanup activity. Each Trade Contractor to provide its worker with all the necessary tools and equipment to do cleanup. There will be no tools or equipment provided by the Construction Management organization. Coordination of the weekly cleanup will be the responsibility of the General Trades Contractor. Designated eating areas will be identified by the Construction Manager. These areas will be the only place for workers to eat and drink. Workers found violating this policy maybe directed to leave the jobsite.
- P. Each Contractor shall be restricted to working hours of 7:00am to 4:00pm unless alternate arrangements are approved by the Construction Manager. This does not alleviate the Trade Contractor's responsibility to work overtime as required to maintain the schedule.

- Q. Signs of any type are prohibited, except as specifically assigned by the Contract Documents.
- R. Each Contractor shall be responsible for the protection of its own materials, tools, equipment, and finish work until substantial completion is granted. Damage to or theft of any materials, tools or equipment prior to substantial completion will be repaired or replaced at the Contractor's expense.
- S. Each Contractor shall provide all temporary heat, utilities and protection required for the completion of all work as scheduled, except where specifically provided by others in the Contract Documents.
- T. Each Contractor shall have their superintendent attend all weekly Trade Contractor Meetings (time & location to be scheduled by Construction Manager).
- U. Each Contractor shall secure all permits required by governing authorities for the completion of its own work scope. This includes all Plumbing, HVAC, Traffic or permit that are issued by the City's Department of Transportation and Engineering, street barricade and other special permits. No Permits will be secured by the Construction Manager.
- V. Each Contractor shall submit daily reports and the weekly work plan twenty-four (24) hours before the weekly Trade Contractor meetings. Failure to submit these items each week for the prior week's work will result in rejection of this Contractor's pay request.
- W. Testing shall be performed in accordance with the Contract Documents. Where Owner and Contractor testing are specified, the Contractor shall provide complete testing. The Owner may provide additional testing at its discretion.
- X. Each Contractor is responsible for the complete review of, and coordination with, the Trade Contract Descriptions for other Contractors. Where overlap occurs, include the cost of such work in your bid, and the Construction Manager will decide which Contractor will perform this work. Appropriate credit will be deducted from the other Contractor's Contract.
- Y. Each Contractor must provide a full-time superintendent on site throughout the duration of their work on site. This superintendent shall be authorized to make all decisions relative to the work on site, and shall be the primary contact for all correspondence. Part time or token representatives who are not so authorized will not be permitted. Failure to comply with this requirement will result in rejection of this Contractor's pay request. Any change of superintendent shall be pre-approved by the Construction

Manager.

- Z. Time is of essence on this project. Each Trade Contractor shall phase, construct and complete their work within the requirements included in Specification Section 013216 and the subsequent development of and updating of the Banks Phase 3B – Bid Package 6 Schedule by the Construction Manager.
- AA. Each Contractor shall complete the Resource Utilization and Inclusion Tracking Forms that are included in the Specifications. The forms shall be completed on a monthly basis and submitted with the monthly pay request. Completed resource utilization forms must be submitted with the pay request in order for the pay request to be processed.
- AB. Each Contractor will be required to attend several phasing meetings pertaining to Lean Construction. Contractor shall have the appropriate personnel (more than one) attend the reverse phase scheduling meeting. Each Trade Contractor shall participate in the implementation of the Lean Construction process throughout the duration of the Project.
- AC. Safety hard hats, safety eye protection, High Vis, and Gloves shall be worn by all employees on this job site. This includes all of this Contractor's Subcontractors and Suppliers.
- AD. This Contractor shall comply with all requirements of the Williams-Stiger Occupational Safety and Health Act of 1970 and subsequent amendments thereto. This Contractor shall furnish to the Construction Manager a copy of its Safety Program, including a copy of its Hazardous Material Program, prior to the commencement of work on site. No payment will be made until these documents are received.
- AE. Any barricade or safety device removed by this Contractor's employees shall be immediately re-erected by Contractor. Upon failure to do so, the Construction Manager may direct the re-erection of it and the cost will be paid by the Contractor.
- AF. All shop drawings and submittals must be submitted within one week from Notice to proceed, unless otherwise specified. No pay request will be processed until all required submittals have been received.
- AG. Each Contractor shall provide personnel for traffic control and traffic coordination during all deliveries of material and equipment required in their scope of work. The Contractor shall coordinate all such activities with the Construction Manager and the City of Cincinnati, Department of Transportation and Engineering.
- AH. All portions of existing site and all utilities not part of the Work which are damaged, moved or altered in any way during construction shall be replaced

or repaired to the County's satisfaction at the Contractors expense.

- AI. Each Trade Contractor shall include in their Schedule of Values (G702) a line item for their Small Business Enterprise spending. Each SBE should be shown separately.
- AJ. Each Contractor shall attend the pre-award conference. This conference will be scheduled by the Construction Manager. All trade contractors shall be notified in writing of the date the conference will be held.
- AK. Each Contractor shall update their record / as-built drawings on a monthly basis, the updated as-built shall be submitted to the Construction Manager by the 20th of the month. If the Contractors as-builts are not updated and submitted, the Contractors pay request for that month will not be processed.
- AL. Each Trade Contractor shall make good faith efforts to meet and/or exceed the project workforce participation goals as outlined in Section 008260 page 15.
- AN. To facilitate the punch list process, each Trade Contractor must complete its punch list items within 3 business days (excluding weekends) of receipt (via fax, email, or distribution to the site leader) of each punch list item. Failure to complete the punch list will result in a back charge for the total cost, to have others complete the work as designated by the Construction Manager.
- AO. Trade Contractor to identify recycle and waste management opportunities when assessing their scope of work. These items will be reviewed at the pre-award meeting.
- AP. The flow of traffic on City streets and public walkways must be maintained at all times. It shall be this Trade Contractor's responsibility to obtain all permits and provide all labor and material that are necessary for street and sidewalk lane closures. All work involved that impacts existing streets and/or sidewalks or impedes public access in any way shall be coordinated through the Construction Manager **prior to the date of the work.**

AQ. The Construction Manager will be utilizing a web-based information management system to facilitate communications among project partners including but not limited to Owners, Architects, Engineers, Construction Manager, and Trade Contractors. The system being utilized is Viewpoint Teams document management software. All trade contractors must have an e-mail address and access to the internet. Viewpoint will be utilized for the following functions:

- Project Contact Directory- this will be maintained by the Construction Manager
- Requests for Information Management
- Meeting Minutes Distribution
- Posting of Official Notices and/or Communications
- Submittal Management
- Contract Document Management
 - Contract Drawings in PDF
 - Site Photographs
- Punchlist Management
- Field Work Order Management

The Construction Manager will issue user names and passwords to each Trade Contractor and will provide training and technical assistants to the user groups. Use of this system is mandatory. There will be no costs passed on to the users for access to the system or license fees. Users will be responsible for the costs associated with access to the internet.

AR. All Contractors shall use platform type ladders where ladders are necessary on this project. Other ladder types will not be allowed on site.

2. **A. CONTRACT DESCRIPTION TC-09: Lot 23 Park**

The Scope of Work in this Contract TC-09 includes all labor, material, tools, equipment, services, and supervision necessary to complete all work specified herein, in accordance with the Contract Documents, as described below to a complete functional safe and operating state.

Included is the Work as indicated in this Contract Description TC-09 the Drawings, the General Conditions and Division 1 of the General Requirements. This scope of work includes, but is not necessarily limited to, the following Specification Sections:

Bidding Requirements, Contract Forms and Conditions of the Contract

The following items represent specific inclusions in this Contract TC-09: Lot 23 Park. They are provided as a guide to aid in the assignment of work and in no way should be construed as being all-inclusive. BP#6 contains scopes of work with different wages rates and contracts. Please review or request additional information if it is unclear.

This Contract for the following scope of work will be with the City of Cincinnati

TC-09 includes multiple trades. Please review all trades listed below related to TC-09 scope of work.

The following shall be include:

1. All work associated with Lot 23 parks scope. Lot 28 Scope not to be included. Park scope is typically defined as any work above structural concrete deck and waterproofing.
2. Temporary Toilets, dumpsters, and site fencing to be by TC-10. Temporary fall fencing, plates, covers, etc to be included as required for this scope of work.
3. Concrete Topping slabs to be by TC-10
4. Waterproofing and expansion joints to be by TC-10
5. Site signage and security to be by TC-10
6. General Building Permit is provided by the Construction Manager. Any other required permits or licenses are the responsibility of this Trade Contractor for this work scope.
7. Geotechnical monitoring and testing services are provided by others. This Trade Contractor shall coordinate and assist in the inspection and testing of all work on a daily basis.

8. This Contractor shall include all excavation and backfill as needed. All borrow material or engineered fill shall meet the requirements of the specifications.
9. Contractor to include concrete structure on top of waterproofing including but not limited to light pole bases, mow strip, misc. and foundations located within the park shall be included as part of this trade contract. Reinforcing steel shall be provided as part of this work scope. The Concrete structural podium by TC-04. Race St. Topping slabs and expansion joints by others.
10. Expansion joint and compression seals are not included in this scope of work. Waterproofing by others. Coordination with waterproof installer to be included. Assure no damage to waterproofing while installing TC-09 scope of work.
11. This contractor is responsible for providing all sealants, sealers and admixtures as required for the Parks scope of work.
12. This contractor is to include coordination with all trades for sleeves. This contract to include installation of all sleeves required for TC-09. Include coring for all locations missed. This contractor to be responsible for reinforcing details located at sleeved opening per the documents. Each Trade Contract is to be responsible for their own sleeve installation. This contractor is responsible for maintaining sleeve locations and orientation before and during concrete pours, granite installation, etc.
13. This Contractor shall provide a complete electrical scope as shown within the documents for all park level including but not limited to conduit, wire, light fixtures, light poles, lighting controls, panels, and all associated shut downs.
14. This contractor shall provide a complete plumbing scope installation. To include but not limited to domestic water line from Lot 22, booster pumps, back flows, drinking fountains, irrigation connection, heat trace system, under drains, etc. Drain bodies shown cast into structural podium/tree pits by TC-04. Final connection or adjustment by TC-09. Fire suppression will be by TC-07.
15. Contractor performing work must have all licenses and certifications as required by the specifications and/or authorities having jurisdiction.
16. Provide and maintain temporary protection and plates to maintain safe access across site. Protection of work as required to assure quality.
17. This contractor shall provide temporary safety railing around or protective floor cover over openings in the concrete slabs as required to meet OSHA standards. This includes covers over the sleeve openings.
18. Spoil/trash removal for this work scope is the responsibility of this Trade Contractor. All materials are to be removed from site and legally disposed. Dumpsters provided by TC-10.

19. Temporary water and temporary power required for this work scope shall be the responsibility of this Trade Contractor. TC-08 to provide temporary power stations at ground level.
20. Dewatering as required to complete this work scope shall be the responsibility of this Trade Contractor. All open holes/excavations shall be kept clean and free from water as required by the contract documents. This Trade Contractor shall provide barricades or other measures to protect the public and other workers on site from a fall hazard into holes.
21. This Trade Contractor shall include all reinforcing steel as required for a complete, correct installation.
22. All deliveries, hoisting and rigging into place are to be provided by this Trade Contractor as required.
23. This Trade Contractor shall be responsible for dust control as required for this work scope.
24. Traffic control for this work scope is the responsibility of this Trade Contractor.
25. No washing of the chute will be permitted on site. Wash out of the concrete truck to be done at the batch plant. This contractor is responsible for clean-up of all dunnage from deliveries and hauling off-site within a timely manner.
26. Provide all layout and engineering from control points and benchmarks provided on survey drawings.
27. This Trade Contractor shall include any necessary permits required for temporary road shutdowns if required to perform this work scope.
28. All hoisting and storage associated with this Trade Contract is to be included in this work scope.
29. Reference Section 017419 for removal of all debris.
30. When doing utility work, all work shall be done by an approved contractor as identified by that utility company.
31. This Trade Contractor shall include backfill/soils as identified to meet the specification requirements.
32. The temporary plywood protection shown at the existing garage will be provided and maintained by others.
33. This Contractor shall provide all hangers and inserts as required for a complete, correct installation.
34. Contractor to include Site furnishings and installation per manufacturer requirement/details.
35. Furnish and install all wood/metal blocking as noted and/or required. The temporary plywood protection shown at the existing garage will be maintained and removed at the end of the project by TC-05. Precautions to be made to not damage existing conditions of garage. Patch and repair if damage occurs.
36. All removals and demolition shown on C102 are provided by others.
37. Garage deck expansion joint system is provided by others.
38. A thorough cleaning having the necessary equipment and materials is to be provided for as a form of final cleaning and acceptance, as

required prior to turn over.

39. This Trade Contractor shall include all off hours work required for the specific tie-ins
40. Contractor to include work as shown for East Side granite ramp. Ramp demo and concrete scope to be by TC-10. Granite Finishes to be by TC-09
41. Donor wall modification scope to be included in TC-09. Misc. Demo as required for proper tie ins etc to be provided.
42. Provide all applicable warranties, maintenance, etc per the construction documents.
43. This Trade Contractor shall include a \$ 550,000 allowance to account for potential design changes initiated by the Owner.

TC-09 Ornamental Metals and Misc. Metals

1. Furnish and install all non-stainless and Stainless steel railings and guards, non-stainless bollards, gratings, etc per the construction documents at Park level. Park level is defined as elevated podium deck.
2. Furnish and install all stainless steel railings, guards, and bollards (including concrete infill). Railings, bollards, and misc. metals shown on Slab on Grade by TC-06.
3. Railings located on Lot 27 to be included.
4. Rework of existing Elm St. Railing to be included.
5. Furnish and install all grouting under all misc. and structural metals including but not limited to handrails, railings, and bollards. Installation of new handrails to be coordinated with the removal of temporary handrails – at no time is a safety hazard to be experienced.
6. Miscellaneous metals are included in this Bid Package. Any anchorages, embed plates, anchor bolts, and the like that are required to be embedded in the concrete are also to be furnished and installed. Include all pipe rail, embedded angles, beams, bollards etc. Include pipe guards as shown on the plans, guardrails and handrails.

TC-09 Electric

1. This Contractor shall furnish and install power to all equipment/fixtures. Hook up all equipment/fixtures at the machine and/or disconnect panel is to be provided for. Provide all fuses and disconnects required – per code to make equipment operational.
2. Furnish and install all conduit and wiring for lighting
3. Furnish and install concrete curbs and pads for equipment as needed and/or as required by code.
4. This Trade Contractor shall include all off hours work required for the specific tie-ins and or shutdowns for this Bid Package.
5. This Trade Contractor will be responsible for fire stopping and sealing of penetrations through fire rated and non-rated construction. This Trade Contractor to submit UL drawings on how they plan to handle each different type of penetration through rated partitions. These details are to be strictly adhered to in the field and each penetration is to be labeled with the UL number.
6. Trade Contractors responsibility to coordinate all work and provide all conduit, anchor bolts etc. as required for light pole to function as designed.
7. Provide a pull string for all empty conduits that are to be installed.
8. Contractor to provide lighting submittals, schedule, and delivery dates within 2 week of contract.

TC-09 Plumbing

1. Lot 23 NPW 2" water tap, meter set, piping, meter pit, etc to be included by **TC-04**. Line to be stubbed up on lot 23 column with a valve and cap for future tie in.
2. Include domestic water line and tie in from Lot 22.
3. Install double check valve for NPW with drain down valving.
4. Include under drain loops, lines, etc where shown.
5. Include slot drains per documents.

TC-09 Granite

1. Furnish and install complete granite scope per the construction documents. To include but not limited to: granite pavers, stair treads, seat walls, cladding, decorative features, etc.
2. Granite to match existing Smale Park standard color, texture, and quarry. Samples to be provided and approved prior to material release.
3. Granite installation to be sequenced with waterproofing installation. Waterproofing by Others.
4. Granite pavers thickness as shown on the drawings.
5. Mortar, setting beds, polymeric sand, and other installation materials to be included.
6. Material and installation to be delivered and installed in phases/sequences as the project progresses.
7. On site storage is limited. Limited lay down areas for granite to be provided within Lot B gravel area. Additional areas maybe available but are not guaranteed.
8. Include alteration of existing donor wall. Work to include removal, demo, pour back, add new stone and Re-clad as required per construction documents.

TC-09 Artificial Turf

1. Furnish and install a complete artificial turf system per the construction documents.
2. This contractor to provide subgrade per manufacturers recommendations
3. Include underdrain in lawn area.
4. Include warranty as specified.

TC-09 Landscaping/Irrigation

1. Furnish and install complete landscaping and irrigation system.
2. Soil, trees, plants, shrubs, etc to be included. Tagging of species to be regionally source and approved with architect and owner present.
3. Planting materials to be transplanted in appropriate seasons to maintain proper warranties.
4. Mulch and sod to be included where applicable.
5. Include irrigation system at applicable tree pits and plantings.
6. Include tie downs, restraints, and other installation systems as noted on construction documents.
7. Include complete irrigation system including but not limited to piping, valves, boxes, zoning, controller, wiring, conduit, sleeves, heads, sprayers, and hose down quick disconnects. Irrigation connection to be connected from stub up installed by TC-04.

TC-09 Furnishings

1. Include all site furnishing per the specification including but not limited to bike racks, benches, seats, trash cans, etc.
2. Include all foundations and fasteners required per construction documents and manufacturer recommendations
3. Protect during construction to prevent damage.
4. On site storage is limited. Scheduled deliveries and coordination to be included.

B. CONTRACT DESCRIPTION TC-10: General Trades, Security, and Signage

The Scope of Work in this Contract TC-10 includes all labor, material, tools, equipment, services, and supervision necessary to complete all work specified herein, in accordance with the Contract Documents, as described below to a complete functional safe and operating state.

Included is the Work as indicated in this Contract Description TC-10 the Drawings, the General Conditions and Division 1 of the General Requirements. This scope of work includes, but is not necessarily limited to, the following Specification Sections:

The following items represent specific inclusions in this Contract TC-10: General Trades, Security, and Signage. They are provided as a guide to aid in the assignment of work and in no way should be construed as being all-inclusive.

1. Maintain dumpsters(1 per week), portable restrooms (6), and existing site fencing from 8/1 – End of projects. Reference Site Fencing drawing for location of fencing.
2. Plywood wall shown on Lower level to be maintained and removed by TC-05
3. Temporary water and electric to be included as required for TC-10 scope of work. Temporary power has been provided at ground level.
4. Contractor to furnish and install all expansion joints for Lot 23, 27, and Race St.
5. Contractor to furnish and install a complete waterproofing system per the documents. Waterproofing to be installed in phases as structural decks are completed. Coordination with TC-09 scope to be included. Drainage board to be installed with any means required to prevent movement until soils, gravel, topping slabs, granite, etc are placed on top. Note Waterproofing to be installed on lot 27,23, and Race St.
6. Waterproofing to be inspected by a third party provided by the owner.
7. Contractor to furnish and install all concrete topping slabs on Lot 23, 27, Race St. as shown on the documents. Granite paving by TC-09.
8. Demo and install Elm St. curb cut located on the North end of Lot 27. Provide all required permits and applications.
9. Demo and reinstallation of concrete at the East Side Mehring way ramp to be included. Granite scope by TC-09.
10. Demo of existing Race St. Tree pit by TC-04
11. Provide all structural Bollards located on Race St.
12. Account for all signage work as depicted of the “SG” Drawing series.
13. Note accessories to be provided and furnished – only to the owner. These items are noted in the specifications and SG drawings.
14. This Trade Contractor shall include a \$ 250,000 allowance to account for potential changes initiated by the Owner.

C. Security

Included is the Work as indicated in this Contract Description TC-10 the Drawings, the General Conditions and Division 1 of the General Requirements. This scope of work includes, but is not necessarily limited to, the following Specification Sections:

DIVISION 26	ELECTRICAL
All Sections	Complete
DIVISION 27	COMMUNICATIONS
All Sections	Complete
DIVISION 28	ELECTRONIC SAFETY and SECURITY
All Sections	Complete

The following items represent specific inclusions in this Contract TC-10: Security. They are provided as a guide to aid in the assignment of work and in no way should be construed as being all-inclusive.

1. When doing utility work, all work shall be done by an approved contractor as identified by that utility company.
2. Furnish and install all required conduit, wiring, pull strings, hangers, fasteners, and tie ins.
3. Sleeves to be coordinated and installed by this Trade Contractor as required for this scope of work. Provide coring as required in already placed decks. Coring to be completed per THP specification: Scanning/Xray to be provided.
4. This Trade Contractor shall include all off hours work required for the specific tie-ins and or shutdowns for this Bid Package.
5. This Trade Contractor will be responsible for fire stopping and sealing of penetrations through fire rated and non-rated construction. This Trade Contractor to submit UL drawings on how they plan to handle each different type of penetration through rated partitions. These details are to be strictly adhered to in the field and each penetration is to be labeled with the UL number.
6. Furnish & install a complete operational Security System, inclusive of all required testing which shall be scheduled, coordinated and paid for by this Trade Contractor. Any tests that must be scheduled during other than normal working hours will be paid for by this Trade Contractor. This includes premium time or overtime for the Trade Contractor's personnel and any other governing entity. All materials, temporary facilities, and test apparatus required to perform these tests will be supplied by this Trade Contractor.
7. All work is to be performed by contractors having the appropriate certification and licenses to perform the work.
8. Validation and acceptance of existing raceways that communicate between zones and/or aggregation points is to be included. Verify prior to bid date. Include all required race ways to complete this scope of work.
9. Building Information Modeling (BIM) is part of the project, all coordination and efforts in support of this endeavor is to be provided for.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
BP6 – February 21, 2020
THP #98090.38

10. All communication and activation of phone service is to be provided for – inclusive of the emergency “Blue” phones as well as the needs for the elevator.

SECTION 012100

ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cash allowances to be included in Base Bid.

1.2 RELATED SECTIONS

- A. None.

1.3 CASH ALLOWANCES

A. General:

1. Work related to cash allowances will be performed on a time and material basis. The Contractor shall furnish and certify daily detail records of all labor and materials provided.
2. If the cost to complete the work is less than the cash allowance, a deduct Change Order will be prepared by the County for the cost difference.

B. Cash Allowance Items:

1. Trade Contract TC-09 Cash Allowance No. 1: \$550,000
2. Trade Contract TC-10 Cash Allowance No. 2: \$300,000

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 012200

UNIT PRICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Unit Prices.

1.2 RELATED SECTIONS

1.3 UNIT PRICE

A. General:

1. Unit Price shall be used for adjusting the cost of work added to or deducted from the Base Bid Work defined in the Specifications and Drawings.
 - a. The Contractor shall furnish and certify daily detail records of all labor and materials provided.
 - b. Unit Prices shall be inclusive of all costs for overhead, profit, fees, taxes (where applicable), handling, and installation for completed in-place work.

A. Unit Price Schedule:

- 1.) TC-09 – Concrete Per Cubic Yard including Reinforcing
- 2.) TC-09 – Price per square foot of Granite Pavers installed(2" and 3")
- 3.) TC-09 – Labor Rates

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 012300

ALTERNATES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Alternates to be included in Bid Package No. 1 work. - None

1.2 DEFINITION

- A. Alternates: A change in the scope of work or products and/or methods which may be selected for the work in lieu of corresponding requirements of the Contract Documents.

1.3 GENERAL REQUIREMENTS FOR ALTERNATES

- A. List with the Bid the amounts to be added to or deducted from the Base Bid if the Alternate Bids are accepted.
- B. Alternate construction is to conform in all respects to the requirements of the Contract Documents and, unless specifically changed by the Alternate, all materials, workmanship, methods and details are to conform to the base Contract.
- C. Failure of a Contractor to submit Alternate Bid(s) may result in rejection of the Bid.
- D. Alternate Construction is to be accounted for in the outline schedule required by Specification Sections 011000 and 013216.

1.4 NOTIFICATION

- A. Immediately following award of Contract, the Contractor shall prepare and distribute to each party involved in the performance of the Work notification of the status of each Alternate including those added by Addendum, if any. Alternate status shall be noted as one of the following three conditions:
 - 1. Accepted.
 - 2. Rejected.
 - 3. Deferred for consideration at a later date as indicated.

1.5 ALTERNATE REQUIREMENTS

- A. The descriptions herein for each Alternate are recognized to be abbreviated, but imply that each change must be complete for the scope of work affected.
- B. Coordinate related work with the work of each Alternate.

- C. The following schedule of Alternates describes the scope of each Alternate and does not necessarily detail the full range of materials and processes needed to complete the work.

1.6 ALTERNATE BID SCHEDULE

- A. Alternate No. 01: None

END OF SECTION

SECTION 012513

PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Product options available to Bidders and Contractors, plus procedures for securing approval of proposed substitutions.
- B. Refer to Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS, as amended and modified.

1.2 QUALITY ASSURANCE

- A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.
- B. All bids shall be based upon specified standards or approved substitutes.
- C. Where proprietary products or types of construction are used in Specifications, the first named in any grouping is the one used as the basis of design. Use of a second, third, or approved substitution shall not relieve Contractor of the responsibility of investigating the effect these products will have on the Work.
- D. Include all costs in bid in order to accommodate them.

1.3 PRODUCT OPTIONS

- A. Contract is based on standards of quality established in Contract Documents.
 - 1. In agreeing to the terms and conditions of Contract, Contractor has accepted a responsibility to verify that specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
 - 2. Neither Owner nor Architect has agreed to substitution of materials or methods called for in Contract Documents, except as they may specifically otherwise state in writing.
- B. Materials and/or Methods Specified by Name:
 - 1. This Contract uses materials and methods that are related to the structure's function as Phase III of the Central Riverfront Intermodal Parking Garage. This structure and its systems must function in combination with the prior two Phases of the facility's construction. The item is essential for compatibility or

synchronization with, or maintenance of, existing facilities and equipment.

- C. Where materials and/or methods are specified by name and/or model number, followed by the words "or approved equal":
 - 1. Material and/or method specified by name establishes the required standard of quality.
 - 2. Materials and/or methods proposed by Contractor to be used in lieu of materials and/or methods so specified by name shall in all ways equal or exceed qualities of the named materials and/or methods.
- D. Where the phrase "or equal," or "or approved equal" occurs in Contract Documents, do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Owner in consultation with the Architect.

1.4 SUBSTITUTIONS

- A. Any bidder desiring to use a material, product, equipment, or type of construction not named in Contract Documents shall comply with Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS.
- B. Substitution requests submitted to Construction Manager for approval must be accompanied by such supporting evidence as the Architect may require, such as samples, drawings, specifications, and test reports, giving full and complete information. In all cases, the Owner's decision shall be final and binding on all concerned.
- C. Approval of substitutions shall be announced by the Construction Manager as described in Section 001000.2 - Instructions to Bidders Article 3.3 SUBSTITUTIONS.

1.5 DELAYS

- A. Delays in construction arising by virtue of non-availability of a specified material and/or method will not be considered by the Architect as justifying an extension of Contract Time.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 013100

PROJECT COORDINATION

PART 1 GENERAL

1.1 SUMMARY

- A. Administrative and supervisory requirements necessary for coordination of Work on the Project include, but are not limited to:
 - 1. Contractor responsibilities.
 - 2. Subcontractor responsibilities.
 - 3. Mutual responsibilities.
 - 4. Review of Contract Documents and existing job conditions.
 - 5. Supervision and construction procedures.
 - 6. Labor and materials.

1.2 CONTRACTOR RESPONSIBILITIES

- A. Schedule and coordinate the Work in conformance with the starting and sequencing times, and the Total Contract Time defined in the Construction Documents.
- B. Before starting work at the Project Site, and before purchasing or fabricating materials that are affected by field conditions, inspect the conditions affecting the Work and take the necessary field measurements.
- C. Before fabricating materials or products, examine the Construction Documents for adjacent and related work.
- D. Notify the Construction Manager in writing of work conditions shown or specified that are unsatisfactory for the proper installation and subsequent performance of the Work; or that are not in accordance with the product manufacturer's or fabricator's specifications, requirements or recommendations. Do not proceed with the Work until conditions are correct.

1.3 SUBCONTRACTOR RESPONSIBILITIES

- A. Before starting work at the Project Site, and before purchasing or fabricating materials that are affected by field conditions, inspect the conditions affecting the Work and take the necessary field measurements.
- B. Before fabricating materials or products, examine the Construction Documents for adjacent and related work.

- C. Notify the Contractor in writing of work conditions shown or specified that are unsatisfactory for the proper installation and subsequent performance of the Work; or that are not in accordance with the product manufacturer's or fabricator's specifications, requirements or recommendations. Do not proceed with the Work until conditions are correct.
- D. Abide by the Project Schedule and coordination requests made by the Contractor.

1.4 MUTUAL RESPONSIBILITIES

- A. Supply other Contractors with necessary dimensions and shop drawings where required for the coordination of the Work. Additional cost caused to a Contractor or to the Owner due to ill-timed or defective work or the failure to perform work is the responsibility of the Contractor that caused the additional cost.
- B. Move stored materials that interfere with the operation of the Owner or other Contractors.
- C. Coordinate and cooperate with other Contractors to achieve intended execution of each Section where Work of one Specification Section affects Work of other Sections. Do not install successive Work until conditions are inspected and found satisfactory for successive Work. Installation of successive Work is *prima-facie* evidence that the Contractor for successive work accepts the installation conditions. Performance of successive Work is the responsibility of Contractor that performs the successive work.
- D. Comply with safety codes and regulations applicable to the performance of the Contract. Owner, Architect, and Construction Manager are not liable for observing, checking, instructing and giving directions relating to Contractor's safety procedures. Owner, Architect, and Construction Manager do not review the adequacy of Contractor's safety measures in, on or near construction site.
- E. Owner's field representative, Architect, and Construction Manager do not have the authority to verbally order or approve modifications to the Work. Authorization must be in writing, signed by the Owner's authorized representative, or by Change Order.

1.5 REVIEW OF CONSTRUCTION DOCUMENTS

- A. Conform to requirements of the Construction Documents. If conflicts are found between Drawings, between Specifications, or between Drawings and Specifications, include the most costly material, method or detail in the Contract.
- B. If physical discrepancies are discovered between the actual conditions and those represented by the Construction Documents, report them immediately to the Construction Manager. Do not proceed with the Work, except at risk, until receiving written instructions.

1.6 SUPERVISION AND CONSTRUCTION PROCEDURES

- A. Where laws, codes or standards require supervision or inspection of portions of the

- Work by an architect, engineer, or other competent or qualified person, furnish the necessary supervision and inspection to the satisfaction of the governing authority.
- B. Obtain permission from the Construction Manager before performing work at times other than is allowed by the Construction Documents.
 - C. Project meetings will be held at Construction Manager's field office.
 - D. Owner reserves the right to hold additional job progress meetings at the Owner's discretion. Construction Manager reserves the right to hold additional job progress meetings at the Construction Manager's discretion. Contractor will be given 48 hours notice (when possible) before unscheduled meetings.
 - E. Oral assistance, advice and interpretations given by the Owner, Architect, or Construction Manager relative to construction means, methods, techniques, sequences, procedures, safety precautions or programs is a gratuitous service and is not binding. Non-contractual assistance does not make the Owner, Architect, or Construction Manager responsible for the items.
 - F. Owner will endeavor to observe the Work, but omissions and failures to provide proper material and failure to perform work correctly are the responsibility of the Contractor. Contractor, not the Owner, is responsible for determining that work under the Contract as it proceeds and is completed is performed in accordance with the Construction Documents and governing regulations.

1.7 LABOR AND MATERIALS

- A. Provide products in accordance with the current printed specifications, requirements and recommendations of the products' manufacturers and fabricators. Should the Construction Documents show or specify the application of a product not conforming to the manufacturer's or fabricator's printed specifications, requirements or recommendations, notify the Construction Manager in writing.
- B. The minimum, acceptable standards for products and workmanship on this project shall be in compliance with industry standards, recognized standards of good quality and published standards of recognized National Trade Associations. Use products which are new, sound and of the quality suitable for their application. Orderly position products and align them with the building structure. Make vertical components plumb and horizontal components level, with surface true to line, grade and dimension. Make joinery and connections accurate, close fitting and well made.
- C. Workers employed on the Project shall work together in harmony, and workers newly assigned to the Project shall cooperate and work harmoniously with work forces on the site, including work forces of the Owner, if any. Upon written notice by the Owner or Construction Manager, Contractor shall remove workers not complying with the provisions of the Contract Documents.
- D. Arrange and establish a location satisfactory to the Construction Manager where the workers may eat. Provide a rubbish container, and clean and remove debris at the end of each working day.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 - MEETING TYPES

1.1 General

- A. The Contractor will provide a location for meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Owner, Contractor, Subcontractors, Architect/Engineer and other individuals whose presence is required, as determined by the Contractor.
 - 2. Agenda: Contractor will prepare the meeting agenda and distribute to all invited attendees.
 - 3. Meeting Memoranda: Contractor will conduct the meeting and record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned.

1.2 Preconstruction Conference

- A. Contractor will schedule a preconstruction conference before construction starts, at a time convenient to Owner, Contractor, and Architect/Engineer. Conference will be at Project site or another convenient location. Contractor will review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of Owner, Contractor, Architect/Engineer, and their consultants; Subcontractors and their superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
 - 1. Tentative construction schedule.
 - 2. Phasing.
 - 3. Critical work sequencing and long-lead items.
 - 4. Designation of key personnel and their duties.
 - 5. Procedures for processing field decisions and Change Orders.
 - 6. Procedures for requests for interpretations (RFIs).
 - 7. Procedures for testing and inspecting.
 - 8. Procedures for processing Applications for Payment.
 - 9. Submittal procedures.
 - 10. Sustainability requirements
 - 11. Preparation of Record Documents.

12. Use of the premises and existing building.
13. Work restrictions.
14. Owner's occupancy requirements.
15. Responsibility for temporary facilities and controls.
16. Construction waste management and recycling.
17. Parking availability.
18. Office, work, and storage areas.
19. Equipment deliveries and priorities.
20. Security.
21. Progress cleaning.
22. Working hours.

D. Meeting Memoranda: Contractor will record and distribute meeting memoranda.

1.3 Pre-installation Conferences

- A. Contractor will conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
- B. Attendees: Contractor, Architect/Engineer, Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. The specifications additionally identify Suppliers and/or Subcontractors that are required to attend a pre-installation conference.
- C. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 1. The Contract Documents.
 2. Options.
 3. Related requests for interpretations (RFIs).
 4. Related Change Orders.
 5. Purchases.
 6. Deliveries.
 7. Submittals.
 8. Review of mockups.
 9. Possible conflicts.
 10. Compatibility problems.
 11. Time schedules.
 12. Weather limitations.
 13. Manufacturer's written recommendations.
 14. Warranty requirements.
 15. Compatibility of materials.
 16. Acceptability of substrates.
 17. Temporary facilities and controls.
 18. Space and access limitations.
 19. Regulations of authorities having jurisdiction.

20. Testing and inspecting requirements.
 21. Installation procedures.
 22. Coordination with other work.
 23. Required performance results.
 24. Protection of adjacent work.
 25. Protection of construction and personnel.
 26. Construction waste management and recycling
- D. The Contractor will record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- E. The Contractor will distribute minutes of the meeting to each party present and to parties who should have been present, Architect/Engineer, and Owner.
- F. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- 1.4 Progress (Weekly Work Plan) Meetings: Contractor will conduct progress meetings at weekly intervals. Purpose of meetings is to coordinate work efforts among the participating Subcontractors.
- A. Attendees: Contractor, each Subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- B. Agenda: Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
1. Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to the 6-week look ahead and Reverse Phase Schedules. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time. Review schedule for next period.
 2. Review present and future needs of each entity present, including the following:
 - a. Interface requirements.
 - b. Sequence of operations.
 - c. Status of submittals.
 - d. Deliveries.
 - e. Off-site fabrication.
 - f. Access.
 - g. Site utilization.
 - h. Temporary facilities and controls.
 - i. Work hours.
 - j. Hazards and risks.

- k. Progress cleaning.
 - l. Quality and work standards.
 - m. Status of correction of deficient items.
 - n. Field observations.
 - o. Requests for interpretations (RFIs).
 - p. Status of proposal requests.
 - q. Pending changes.
 - r. Status of Change Orders.
 - s. Pending claims and disputes.
 - t. Documentation of information for payment requests.
 - u. Waste management implementation and progress.
- 3. Minutes: Contractor will record and distribute to all Subcontractors the meeting memoranda.
 - 4. Reporting: Distribute meeting memoranda of the meeting to each party present and to parties who should have been present.
 - 5. Schedule Updating: Contractor will revise the Reverse Phase & 6-week look ahead Schedules after each progress meeting where revisions to the schedule have been made or recognized.

END OF SECTION 01 31 19

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

- 1.1 Subcontractor shall in conjunction with the Contractor develop an accurate schedule for the completion of the work. The Contractor will utilize “Lean Construction - Last Planner” techniques to manage the project. Each Subcontractor will be required to participate in a Reverse-Phase Schedule work session for each phase of the project (phases to be determined). A detailed schedule will be developed for each phase. The detailed schedules shall be consistent with the milestone schedule issued with the bidding documents. Each Subcontractor will be required to come to the weekly Subcontractor meeting prepared with a weekly work plan for the coming week, and a review of work activities required by the detailed schedule for that subcontractor over the next six weeks (six week look ahead schedule).
- 1.2 See Section 00 31 13 – Preliminary Schedules for the Milestone Construction Schedule used for bidding.

PART 2 - LEAN CONSTRUCTION SCHEDULING METHODS

- 2.1 Overview:
 - A. Lean Construction is a tool to manage schedules and production on projects. By planning and managing the work, uncertainty is removed from the project. When production planning becomes reliable and people fulfill their commitments, performance and workflow are improved, and so are the overall results of the project.
 - B. Lean Construction traces its roots to the Toyota Production System developed after World War II. The system aimed to eliminate the inventory and rework of traditional mass production in favor of a reliable production system that could both work and change quickly to meet a customer’s specific requirements without wasteful processes. In mass production, as in traditional construction processes, the project is a series of activities, and the goal is to reduce cost and increase the speed of each activity with consistent high quality.
- 2.2 Application
 - A. Lean Construction involves a systematic approach aiming for more efficient overall workflow. It attempts to understand how value is delivered, making workflow as

consistent and reliable as possible, and then reviewing the results to determine how to improve the planning process. Lean differs from traditional construction methods because it decentralizes hierarchical decision-making. With Lean Construction, those closest to the work (the “Last Planners”) must have the authority to make the decisions and plan the work. It also utilizes peer pressure to get the job done. Subcontractors agree as a group to meet their deadlines, and each is held accountable not only to the Contractor but also to fellow subcontractors.

- B. The project will utilize four key procedures in the implementation of Lean Construction / Last Planner Methods. Many of these steps require the input of the Foremen for the Subcontractors that will perform the work. These steps are as follows:
1. Reverse Phase Scheduling (RPS) – This is a schedule that is created to fit within the parameters of the Master Milestone Schedule. Subcontractors plan the project starting with the last work activity and working backwards. This ensures that all Subcontractors consider what work must be done prior to any schedule activity, and ensures that adequate durations are in place for late activities. This RPS is thought of as “What Should Be Done.”
 2. Rolling Six-Week Look Ahead Schedules – Activities drop off the RPS onto the Six-Week Look Ahead Schedules and are expanded upon. All possible constraints for preventing these activities are identified. This six-week look ahead is the work that “Can Be Done” in the next six-week period.
 3. Weekly Work Plans (WWP) – These plans are brought to Weekly Production Meetings by all Subcontractor foremen and are very specific in regards to the work they “Will Be Doing” in the upcoming week. In order for work activities to be on the WWP, there cannot be any known constraints that would prevent the work from occurring.
 4. Plan of the Day (POD) – These brief daily meetings evaluate daily performance against key activities identified and coordinated in the Weekly Work Plan (WWP). By understanding daily performance, Subcontractor foremen quickly identify barriers and then make minor adjustments to eliminate the barriers allowing work to proceed as planned.

2.3 Implementation

- A. All Subcontractors will be involved with creating the Reverse Phase Schedules (RPS's) for the project. Bidders should include the cost for foremen and project managers from each company to attend ½ day planning sessions to establish the RPS's as required for the complexity of the project.
- B. The Contractor will provide and update the Six-Week Look Ahead Schedules from information developed in the RPS, from Subcontractors input, and will review the same at the weekly jobsite coordination meetings.
- C. Each Subcontractor must complete a Weekly Work Plan (WWP) and provide to the Contractor by noon the day before the weekly jobsite coordination meeting. Each Subcontractor will discuss their activities at the weekly meeting.
- D. All Subcontractor foremen are required to attend the daily POD.

- E. Subcontractors will be required to inform the Contractor, on a daily basis, the status of the work that was committed to be complete.
- F. RPS's may require updating as the project progresses and Subcontractor personnel will be required to participate in meetings to accomplish the same.

2.4 Updates

- A. Six-Week Look-Ahead schedules will be updated weekly.
- B. The Reverse Phase Schedule will be updated periodically as required (Subcontractor participation is mandatory).
- C. The milestone schedule will be updated to reflect to the RPS.

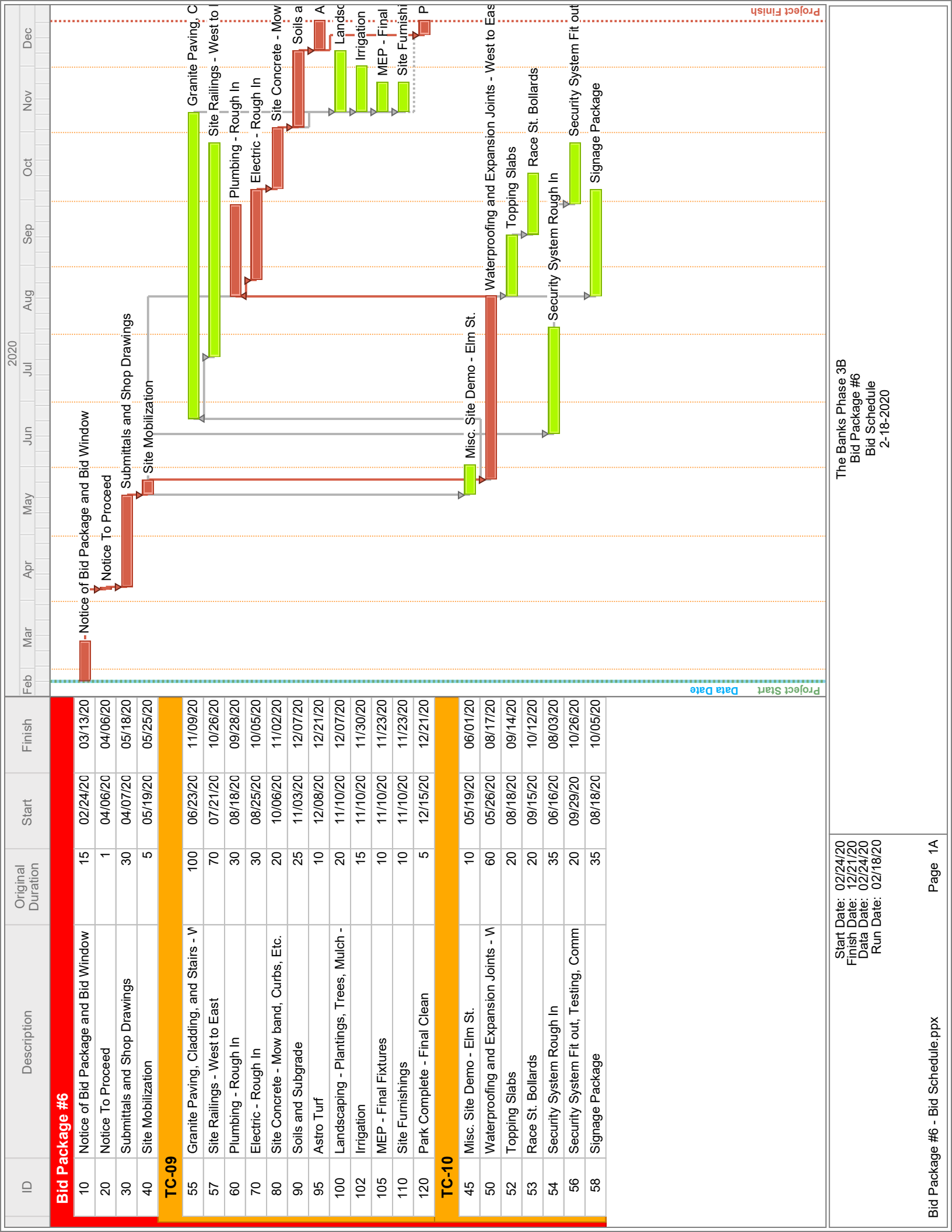
2.5 Distribution

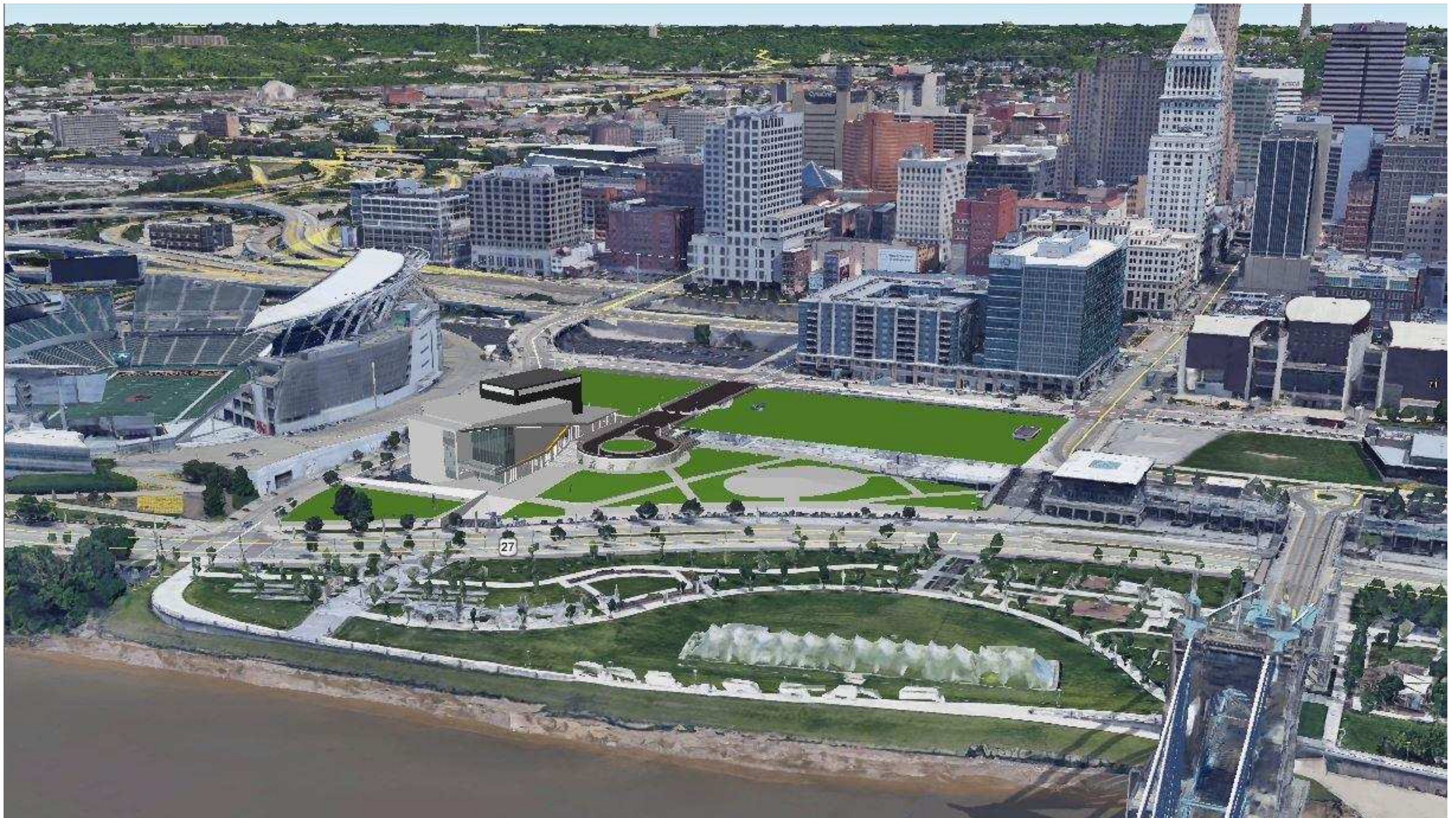
- A. The Contractor will post copies on the electronic Project Management System or make copies for:
 - 1. Subcontractors
 - 2. Architect
 - 3. Engineers
- B. It is the responsibility of each Subcontractor to inform its field personnel, sub-tier subcontractors and material suppliers of the construction progress schedule and updating that occur thereto.

2.6 Records

- A. All Reverse Phase Schedules, and updates to the same, shall become the revised Project Schedule and shall be binding on the Subcontractors. Manpower, equipment and material adjustments as necessary to meet the RPS's as created by the project team members is the responsibility of each Subcontractor.

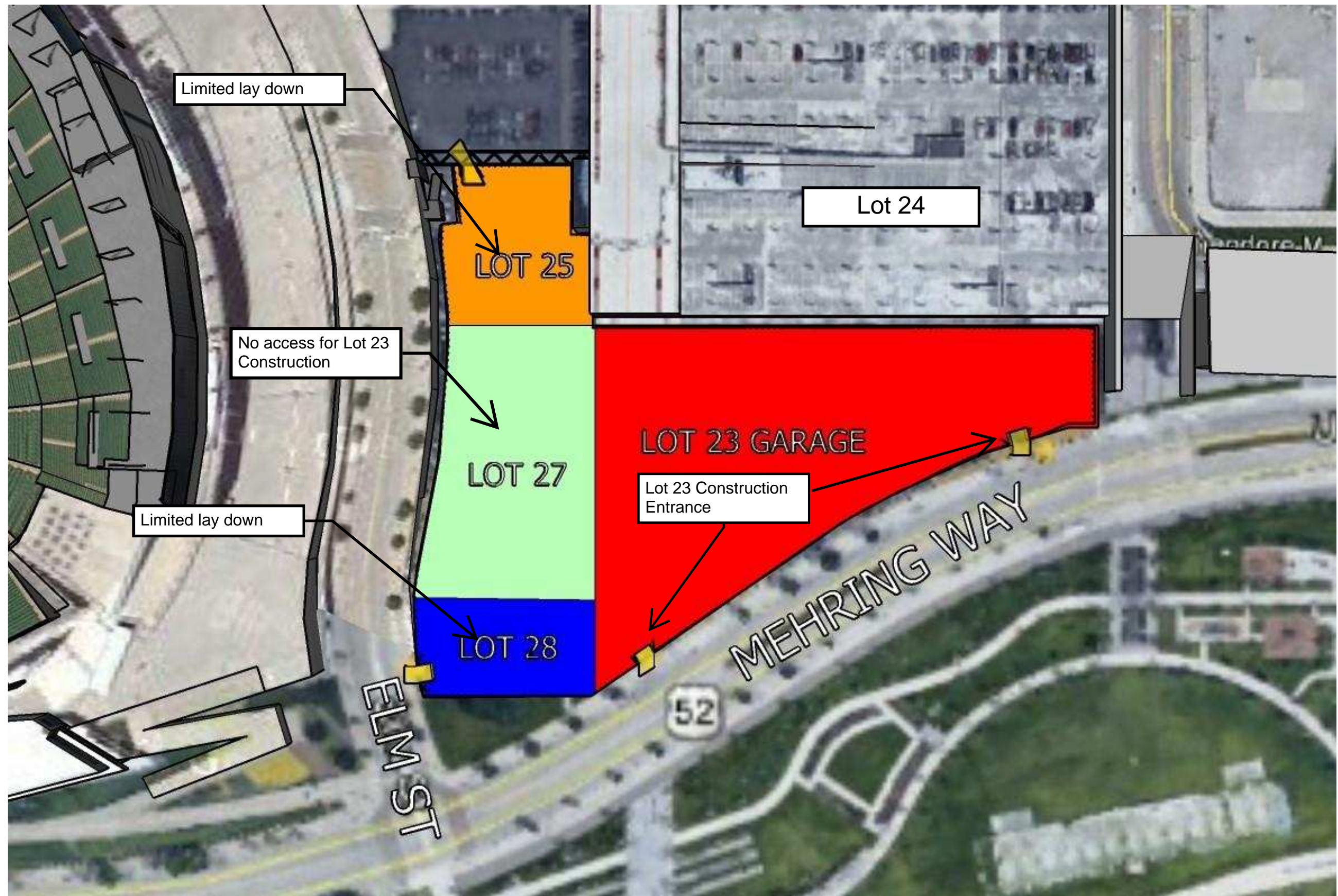
END OF SECTION 01 32 16





THE BANKS PHASE 3B CINCINNATI, OH

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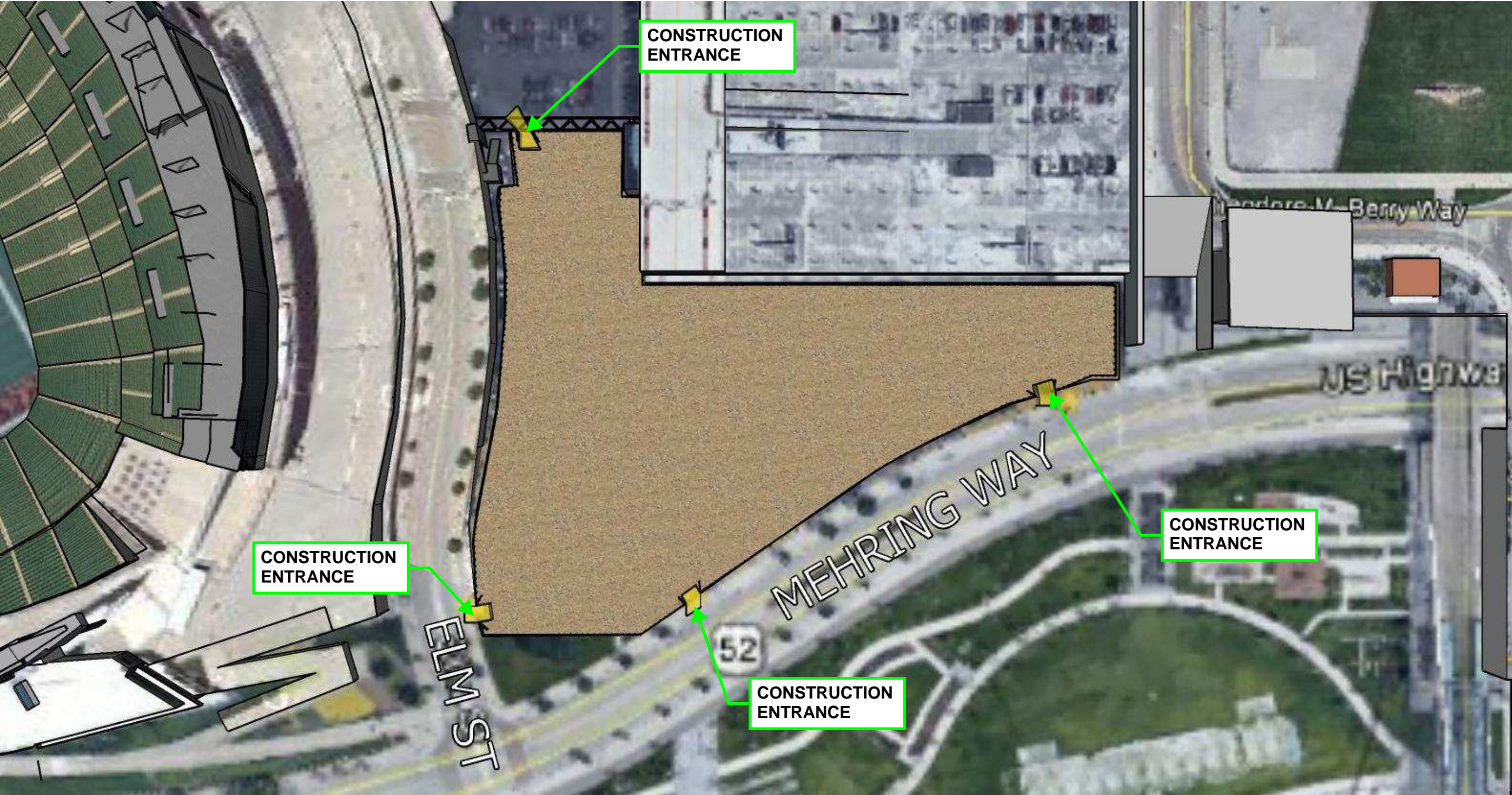
Lot Designations

LEGEND

Construction Site Fence

CONSTRUCTION ENTRANCE

Notes:

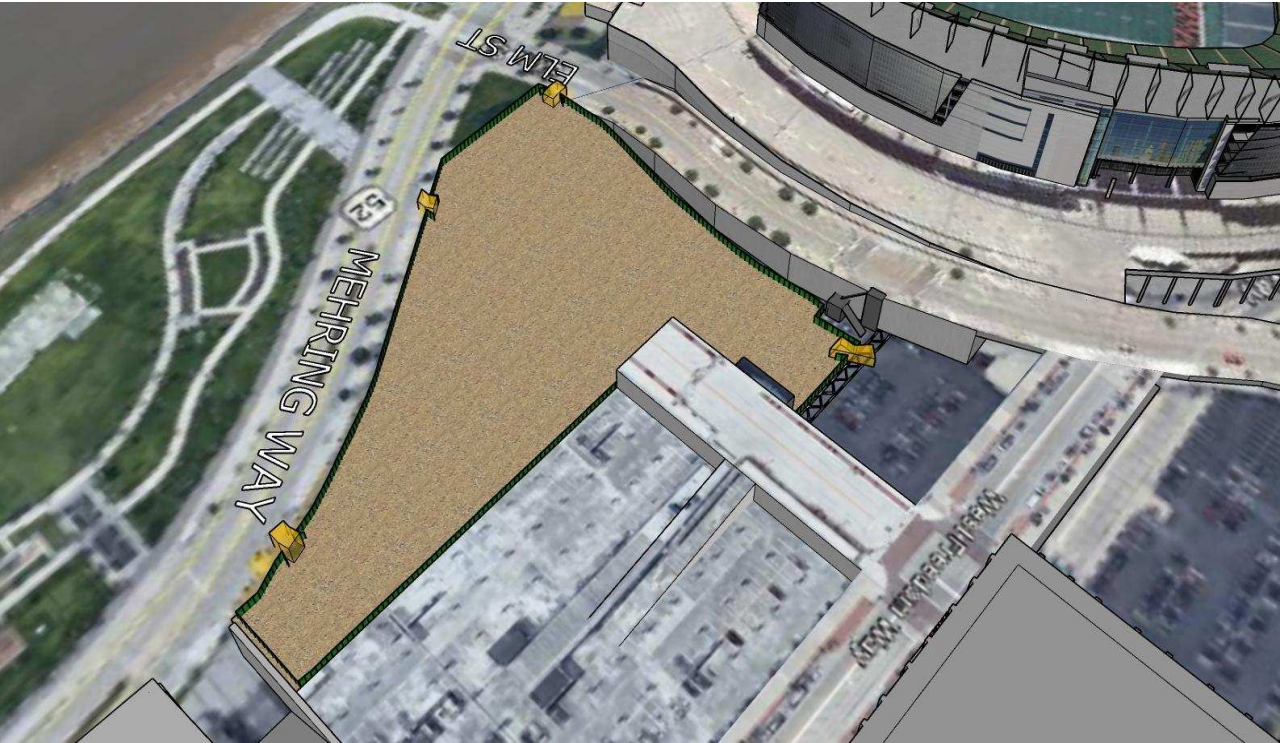
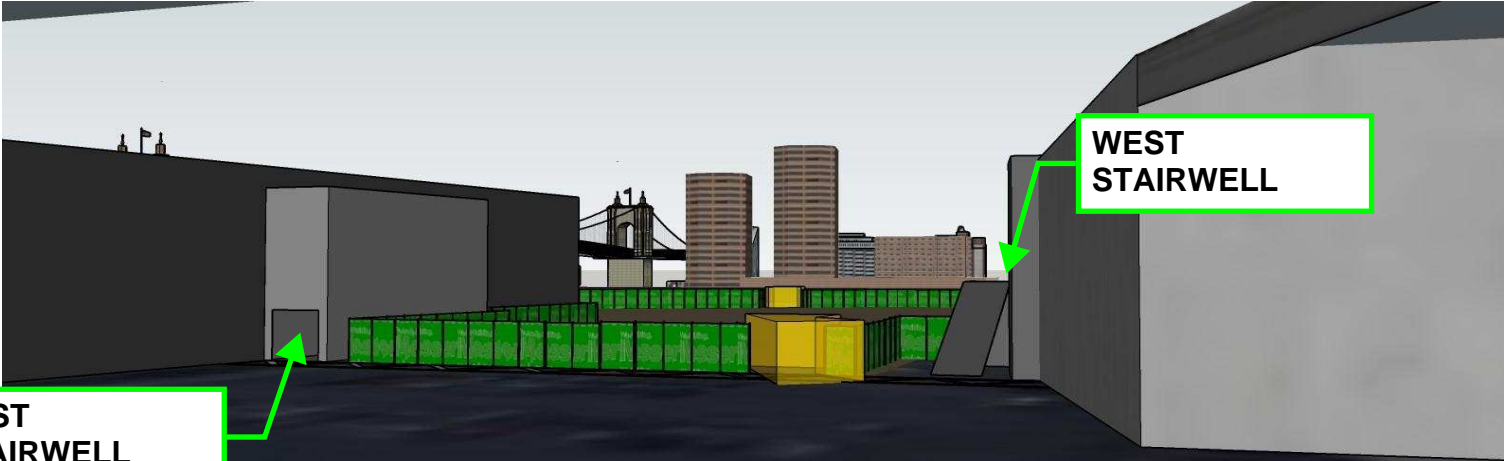
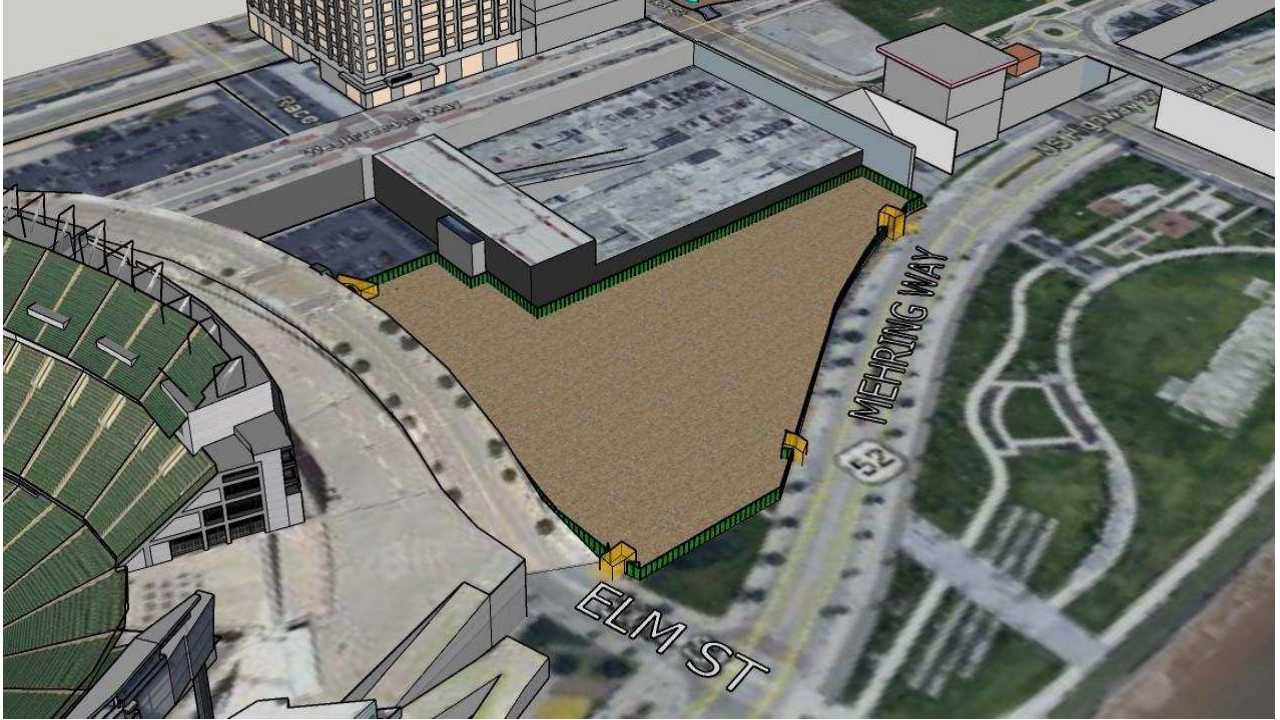


LEGEND

Construction Site Fence

CONSTRUCTION ENTRANCE

Notes:



VIEWS OF SITE FENCING LAYOUT

SECTION 01 32 26

CONSTRUCTION PROGRESS REPORTING

PART 1 - GENERAL

1.1 Daily Reports

- A. Subcontractors are required to prepare daily reports. This daily construction report should record at a minimum, the following information concerning events at the project site:

1. Number of personnel onsite, including subcontractors.
2. Summary of work completed.
3. Equipment onsite.
4. Material deliveries.
5. High and low temperatures and general weather conditions, including the presence of snow or rain.
6. Accidents or incidents.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recordings.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change orders received and implemented.
13. Construction change directives received and implemented.
14. Services connected and disconnected.
15. Equipment or system tests and startups.

- 1.2 Reports are to be submitted in a neat and legible format daily to Contractor each morning for the previous day's work.

END OF SECTION 01 32 26

SECTION 013300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. List of proposed subcontractors and suppliers.
- B. Contractor's Construction Schedule.
- C. Schedule of Values.
- D. Guarantees and Warranties.
- E. Refer to Section 013100 for Project Coordination procedures and requirements.
- F. Refer to Section 013323 for submittal requirements on Shop Drawings, Product Data, and Samples.

1.2 SUBCONTRACTOR AND SUPPLIER LIST

- A. Submit with Bid. Refer to Section 001000.

1.3 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Submit to Construction Manager complete itemized Contractor's Construction Schedule, within three (3) business days of execution of contract, coordinated with all subcontractors, in accordance with Sections 013216 and 013323.
- B. Revise Contractor's Construction Schedule monthly, at the time of submittal of a request for payment. When Contractor's Construction Schedule is unchanged, submit a letter certifying that the previous Schedule is unchanged.

1.4 SCHEDULE OF VALUES

- A. Submit to Construction Manager a Schedule of Values, within three (3) business days of execution of contract, coordinated with all subcontractors, in accordance with the General Conditions.
- B. Prior to preparation of Schedule of Values, review proposed subdivisions of work in the Schedule of Values with Construction Manager and Architect, for approval.

1.5 GUARANTEES AND WARRANTIES

- A. With request for inspection for Substantial Completion, submit all warranties, guarantees and bonds in accordance with Section 014000 – Quality Requirements.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 013323

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 GENERAL

1.1 SUMMARY

- A. This Section specifies procedural requirements for non-administrative submittals, including shop drawings, product data, samples, coordination drawings and other work-related submittals. Shop drawings, product data, samples, coordination drawings and other work-related submittals are required to amplify, expand and coordinate information contained in Contract Documents.
- B. Refer to other Division 01 Sections and other Contract Documents for specifications on administrative, non-work-related submittals. Those submittals include, but are not limited to:
 - 1. Permits.
 - 2. Payment applications.
 - 3. Performance and payment bonds.
 - 4. Insurance certificates.
 - 5. Inspection, testing, and certification reports.
 - 6. Schedule of values.
 - 7. Progress reports.
 - 8. Listing of subcontractors.
 - 9. Safety plans and other emergency procedures.
 - 10. Schedules.
- C. Miscellaneous submittals are work-related, non-administrative submittals that do not conform to the previous two categories, including but not limited to:
 - 1. Survey data and reports.
 - 2. Project photographs.
 - 3. Record drawings.
 - 4. Field measurement data.

1.2 SUBMITTAL PROCEDURES

A. General:

1. Submit complete and detailed information required by the Specifications. Construction Manager will approve or reject them with reasonable promptness.
2. Before forwarding information to Construction Manager, review submittal information, check conditions, mark corrections, and sign and date each set.
3. Construction Manager will not review submittal information Contractor has not signed. Contractor's signature means Contractor has checked the submittals for conformance to the project requirements and compatibility with related work.
4. Except where otherwise indicated, the Construction Manager will utilize construction project collaboration software for the electronic transmission, tracking, and management of all submittals. Refer to Section 011100 – Summary of Work.

B. Coordination:

1. Coordinate submittal preparation and processing with prosecution of the Work. Coordinate each submittal with other submittals and related activities including testing, purchasing, fabrication, delivery and similar activities that require sequential activity.
2. Contractor shall review, coordinate and forward submittals of interrelated work as a single, comprehensive submittal package to Construction Manager.

C. Submittal Time Coordination:

1. Prepare and transmit each submittal to the Construction Manager within 14 calendar days after award of Contract, or as agreed to by the Construction Manager. Prepare and transmit in advance of scheduled performance of related work and other applicable activities.
2. Construction Manager reserves the right to withhold action on submittals that require coordination with other submittals until the related submittals have been received by the Construction Manager.

D. Review Time:

1. Allow minimum of 14 calendar days so the Project will not be delayed because of time required to properly process submittals, including time for resubmittal, if necessary. Advise the Construction Manager on each submittal if processing time is critical to progress of the Work and if the Work would be expedited if processing time is shortened.

2. Construction Manager will advise Contractor when a submittal being processed will be delayed for coordination.
 3. Owner will not extend Total Contract Time because of Contractor's failure to transmit submittals to the Construction Manager sufficiently in advance of the affected portion of Work.
- E. Submittal Preparation: Mark each submittal with a permanent label for identification. Provide the following information on the label for proper processing and recording of the submittal:
1. Project name.
 2. Date.
 3. Name and address of Contractor.
 4. Name and address of Subcontractor.
 5. Name and address of supplier.
 6. Name of manufacturer.
 7. Number and title of appropriate Specification Section.
 8. Drawing number and detail references, as appropriate.
 9. Similar definitive information as necessary.
 10. Stamp each piece of literature or drawing being submitted. A stamp impression on a separate sheet is not permitted. After Contract Award, the Construction Manager will provide further instructions for the stamp's format and contents.
- F. Submittal Transmittal:
1. Appropriately package each submittal for transmittal and handling. Include a transmittal form with each hard copy or electronic file submittal from Contractor to Construction Manager. Submittals received from sources other than Contractor will be returned to Contractor without action.
 2. Format of transmittal form shall be approved by the Construction Manager.
 3. On the transmittal form, record relevant information, any requests for data, as well as any deviations from the requirements of the Contract Documents, including minor variations and limitations.

1.3 SPECIFIC SUBMITTAL REQUIREMENTS

- A. General: Comply with requirements specified herein for each type of submittal, as well

- as any additional specific submittal requirements for individual units of work specified in the applicable Specification Section.
- B. Provide special notation of dimensions established by field measurement. Highlight, encircle and otherwise indicate deviations from Contract Documents. Construction Manager will not review shop drawings having incomplete dimensions. Construction Manager and Architect will not review or verify accuracy of field dimensions.
 - D. Inspection, Testing, and Certification Reports:
 - 1. Classify each inspection and test report as being either shop drawings or product data, depending on whether the report is specially prepared for the project, or a standard publication of workmanship control testing at the point of production.
 - 2. Process inspection and test reports accordingly.
 - E. Warranties:
 - 1. Refer to Section 014000 for general and specific requirements for warranties, product bonds, workmanship bonds and maintenance agreements.
 - 2. In addition to copies desired for Contractor's use, furnish five (5) executed copies of warranties, bonds or agreements. Provide additional copies of warranties for Operations & Maintenance Manuals.
 - F. Survey Data: Refer to Section 017700 and individual Sections for general and specific requirements on property surveys, field measurements, quantitative records of actual work, damage surveys, and similar data required by individual Sections of these Specifications.

1.4 SUBMITTAL ACTION MARKINGS

- A. Interpret the action marking of the Architect or Engineer on returned submittals as follows:
 - 1. NO EXCEPTIONS NOTED, or other similar wording:

No corrections; proceed with the work.
 - 2. EXCEPTIONS NOTED, or other similar wording:

Do not fabricate or furnish items noted for correction without correcting noted discrepancies. Resubmittal is not required for approval, but resubmittal is required for the Owner's records for as-built documentation.
 - 3. EXCEPTIONS NOTED, REVISE AND RESUBMIT, or other similar wording:

Submittal is rejected as not in accordance with Contract requirements, or for other justified cause. Correct deficiencies and resubmit for further review.

1.5 ADDITIONAL SUBMITTALS

- A. Permits, Licenses and Certificates: For the Owner's records, submit to Construction Manager copies of permits, licenses, certificates, inspection reports, releases, jurisdiction settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations which bear on the Work.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES – 5S PROGRAM

PART 1 - GENERAL

1.1 SUMMARY

- A. The Messer Zero Injury culture embraces the 5S Strategy to create a safe, organized jobsite to prevent slips, trips and falls.
- B. The Messer 5S Program has been put in place to drive consistency across all projects and set a “Best in Class” standard to help achieve Zero Injury by eliminating slips/trips/falls from poor housekeeping/organization.
- C. This summary should in no way be construed as being all-inclusive. It is issued as a guide to aid each Subcontractor in their understanding of the 5S expectations on this project.

1.2 PROJECT DESCRIPTION AND REQUIREMENTS

- A. As a part of the Lean Culture on Messer project sites, the team is instituting the following MINIMUM requirements for each trade contractor to achieve a safer more productive project.
- B. Failure to abide by any of the requirements below will result in a back charge of \$250/man hour needed to address any deficiencies.
- C. The components of the 5S Program are as follows:
 - 1. **SORT - Just in time Deliveries:** Materials are only allowed to be delivered to the site if they will be installed within a one week time period of delivery. Any materials that will not be installed must be removed from the site. All materials must be stored in designated areas and out of egress pathways and access locations.
 - 2. **Straighten – Organized Material & Equipment Storage:** Materials and equipment must be stored in designated laydown areas. Walking and working spaces must be kept organized at all times. No material or equipment is allowed to be stored in egress/access paths. Storage requirements for exterior and interior spaces are as follows:
 - a. Exterior – Materials and equipment must be stored in designated areas on dunnage, pallets or carts.
 - b. Interior – Materials and equipment must be stored in designated areas on pallets, carts or racks and easily moveable on wheels.
 - 3. **Shine – Continuous Daily Cleanup:** Requirements for continuous cleanup for exterior and interior spaces area as follows:
 - a. Exterior
 - 1) Each trade contractor shall immediately pick up all of their debris and deposit it into mobile trash carts/hoppers (provided by respective trade contractor). Each trade contractor is responsible for emptying these containers into a

dumpster provided by Messer.

- 2) Every trade contractor is required at the end of each and every workday to cleanup and organize equipment, materials and debris from that day's work activities and clean their work area.
- b. Interior: Nothing Hits the Floor – Daily cleanup:
 - 1) *Every work crew has a cart* with necessary cleaning tools. Each trade contractor shall immediately deposit their debris into mobile trash carts (provide by respective trade contractor). Each trade contractor is responsible to remove these carts from the building daily and empty them into a dumpster provided by Messer.
 - 2) Every trade contractor is required at the end of every workday to cleanup and organize equipment, materials, and debris from that day's work activities and sweep their work area.
 - 3) Electrical cords, welding leads, temporary heat, and temporary water lines are to be off the floor 100% of the time and suspended using non-conductive materials.
4. **Standardize – Color Coded Delivery Process:** Each trade contractor will be designated a specific paint or sticker color (designated by Messer and provided by respective trade contractor) to mark all deliverables to the project. All materials, including but not limited to, pallets, packaging, boxes, buckets, etc., must be marked with their respective paint color. All items that are not marked upon arrival at the project site, will be rejected.
5. **Sustain – Composite Broom Crew:** Every week, or at Messer's request, each company shall provide personnel to participate in cleaning all unidentified debris and broom sweeping for a full work shift or until complete. This polishing effort is in addition to normal daily cleaning.
 - a. Each trade contractor shall provide (1) person for every (10) people working onsite for respective company (including subcontractors) to participate in composite crew.
 - 1) Minimum participation by each trade contractor is (1) person, regardless of number of people trade contractor has on site up to (10).
 - 2) Participation requirement applies for each week the trade contractor has personnel on the project site.
 - b. Each trade contractor shall furnish all equipment, including but not limited to, brooms, shovels, and dump carts, to complete this activity.
 - c. CM will determine the location and scope of the composite cleaning crew each week as dictated by the project conditions. It is understood that this may include "exterior trades" will need to work inside the building and vice versa as project conditions require to maintain the best possible project conditions.
 - d. Failure to provide the personnel and equipment as described above will result in a backcharge per 1.2.B above.

1.3 ASSIGNMENT OF RESPONSIBILITY

- A. The CM will provide the following as a part of the 5S Program
1. Logistics planning for designated material storage and assignment of color codes
 2. Dumpsters located appropriately for trade contractors to empty carts
 3. Oversight of composite cleaning crews.
- B. Each trade contractor will provide, at a minimum, the following for the 5S Program
1. Mobile Trash Carts/Hopper
 - a. One cart per each individual crew
 - b. Covers for carts as applicable to project work requirements
 2. Cleaning Equipment
 - a. Brooms, shovels, etc., for daily cleanup and composite crews
 3. Marking Paint and/or Colored Tags for materials, equipment, etc., brought to the project site.
- C. Color Codes for all trade contractor material delivered to/stored on the project site are as follows:

Construction Manager	Green	
General Trades	Red	
Sitework	Yellow	
Steel	Dark Blue	
Roofing	White	
Aluminum & Glass	Orange	
Framing & Drywall	Light Blue	
Flooring	Maroon	
Fire Protection	Pink	
Plumbing	Purple	
HVAC	Silver	
Electric	Light Green	
Telecommunications	Brown	
Painting	Black	

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
BP6 – February 21, 2020
THP #98090.38

END OF SECTION 01 35 43

SECTION 014000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Required inspection and testing services assist in the determination of compliance of the Work with specified or indicated requirements. Required services do not relieve Contractor of the responsibility to comply with Contract Documents.
- B. Quality control services include inspections, tests and related actions, including reports performed by independent agencies and governing authorities.
- C. Specific quality control requirements for individual units of work are in those Specifications Sections.
- D. Inspections, tests and related actions specified in Contract Documents are not intended to limit Contractor's quality control procedures which facilitate overall compliance with Contract Document requirements.
- E. Requirements for Contractor to provide quality control services required by the Owner, governing authorities or other authorized entities are not limited by provisions of this Section.
- F. Replace rejected work at no additional cost to the Owner and without extension to Total Contract Time.

1.2 RESPONSIBILITIES

- A. Contractor Responsibilities:
 - 1. All inspections, tests and similar quality control services are Contractor's responsibility except where specifically indicated as being the Owner's responsibility, or where specifically indicated as the responsibility of another agency or organization.
 - 2. Costs for quality control services that are the Contractor's responsibility which are specified to be performed by an independent lab or agency (not directly by Contractor) shall be included in the Base Bid.
 - 3. Where services are specified to be performed by an independent lab or agency, Contractor shall employ and pay an independent agency, testing laboratory or other qualified firm approved by the Owner.
- B. Owner Responsibilities:

1. Owner will pay for quality control testing associated with geotechnical testing and inspection, ready-mix concrete testing and inspection, and reinforcing steel inspections, unless noted otherwise.
 2. Owner will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are the Owner's responsibility.
- C. Retest Responsibility:
1. When results of required inspections, tests or similar services indicate non-complying Work, subsequent tests are Contractor's responsibility.
 2. Testing of revised and replaced work is Contractor's responsibility.
- D. Responsibility for Associated Services:
1. Cooperate with independent agencies performing required inspections, tests and similar services by providing auxiliary services listed in this paragraph.
 - a. Provide access.
 - b. Take samples or assist with taking samples.
 - c. Deliver samples to test laboratories.
 - d. Secure and protect samples and test equipment at the Project Site.
 2. Provide other auxiliary services as are reasonably requested.
- E. Coordination:
1. Coordinate the sequence of inspections, tests and similar services to accommodate those required services with a minimum of delay in progress of the Work. Coordinate to avoid removing and replacing work to accommodate inspections and tests. Contractor is responsible for scheduling times for inspections, tests, taking of samples and similar activities, whether the services are the Owner's or Contractor's responsibility.
 2. If the laws, ordinances, rules, regulations or order of public authorities having jurisdiction require work to be inspected, tested or approved, notify the Construction Manager in advance so the Construction Manager may observe inspection, testing or approval.
- F. Special Tests:
1. Owner may require Contractor to perform special tests on installed materials or equipment to verify conformance to Specifications.

2. Owner will pay for the tests if materials or equipment meet or exceed specified requirements. If tested items fail to meet requirements, Contractor is responsible for costs of the tests and to make corrections at no cost to the Owner.

1.3 QUALITY ASSURANCE

A. Qualification for Service Agencies:

1. Except as otherwise indicated, engage inspection and test service agencies, including independent testing laboratories, which are prequalified as complying with *Recommended Requirements for Independent Laboratory Qualification* by the American Council of Independent Laboratories, and which are recognized in the industry as specialized in the types of inspections and tests to be performed.
2. Contractor's testing agencies are subject to approval by the Owner.

B. Codes and Standards: Perform required testing in accordance with applicable codes and regulations and with selected standards indicated in the Specifications Sections.

1.4 SUBMITTALS

A. General:

1. Refer to Section 013323 for general submittal requirements and Section 017700 for close-out requirements. Refer to individual Specification Sections for specific requirements.
2. Distribute certified, written reports of each inspection, test or similar service directly to:
 - a. Construction Manager: 4 hard copies, or electronically if agreed to by the Construction Manager.
 - b. Submit additional copies of each written report directly to the governing authority if the Owner or Construction Manager so directs.

B. Report Data: Written reports of each inspection, test or similar service shall include, but are not limited to:

1. Name of testing agency or test laboratory.
2. Dates and detailed description of exact location(s) of where samples were taken or where tests or inspections were performed.
3. Names of individuals making the inspection or test.
4. Designation of the work and test method.
5. Complete inspection or test data.

6. Test results.
 7. Interpretations of test results.
 8. Notation of significant ambient conditions at the time of sample taking and testing.
 9. Comments or professional opinion of whether inspected or tested work complies with the requirements of Contract Documents.
 10. Recommendations on retesting, if applicable.
- C. The Contractor is responsible for notifying the testing agency or laboratory of the requirements of this Section.

1.5 REPAIR AND PROTECTION

- A. General:
1. After completing inspection, testing, sample-taking and similar services, repair damaged Work and restore substrates and finishes to eliminate deficiencies, including deficiencies in the visual qualities of exposed finishes.
 2. Protect Work exposed by quality control service activities, and protect repaired Work.
 3. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

1.6 GUARANTEES, WARRANTIES AND BONDS

- A. Warrant the Work for one (1) year, starting with date of Substantial Completion for the Contract, unless the requirements herein are superseded by more stringent requirements in individual technical Specification Sections.
- B. Should defects develop in the Work within the specified period due to faulty materials or workmanship, correct the Work to conform to Contract Documents. Execute repairs and corrective work, including cost of making good other work damaged or otherwise affected by making repairs, without extra charge to Owner and within 5 calendar days after written notice by the Owner or Construction Manager. On parts of the Work corrected under the Warranty, extend the warranty period for the corrected parts for one year from the date of correction.
- C. Submit five (5) copies of warranties, guarantees and bonds. Show the name and location of the Project and the name of the Owner (County of Hamilton). Owner shall have the right to assign warranties, guarantees and bonds in whole or in part to end-users as designated by the Owner (for example, the warranty for the roadway and piping work may be, if deemed appropriate by the Owner, assigned to the City of

Cincinnati).

- D. Delivery of warranties, guarantees and bonds does not relieve Contractor of obligations of the Contract.

1.7 FORM OF WARRANTY

- A. Warranty period on equipment, labor and materials shall be the manufacturer's standard, or as specified in the Specifications Sections, but not less than required by paragraph 1.6.A this Section.
- B. Furnish specified written warranties with the request for inspection for Certificate of Substantial Completion. Submit warranties on Contractor's letterhead. Include one warranty for each separate Contractor and Subcontractor scope or unit of work, signed jointly by Contractor and Subcontractor or supplier.
- C. Form of warranty is as follows (form of warranty not written as follows is cause for its rejection):

(Form of Warranty is on the following page.)

WARRANTY

Name of Project: _____

Scope of Work: _____

We warrant the Work to be in accordance with the Contract Documents. We will correct the parts of the Work not in conformance with the Contract Documents, or that becomes, or is found to be defective, within one year after the Date of Substantial Completion. We will bear the cost of making good the damage caused by the defective Work, including damage caused by its correction or removal, to the Owner's property or to property for which the Owner is liable. This warranty does not apply to Work which has been abused, neglected or altered by others. The warranty period begins at 12:00 Noon on the date of Substantial Completion.

Substantial Completion Date: _____ (*)

Signed by:

Contractor: _____

Subcontractor/Supplier: _____

* (Obtain this date from the Owner before completing the warranty form. Insert the date on the indicated line. Do not type this instruction on the Warranty Form.)

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 014216

DEFINITIONS, STANDARDS, AND REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. General:

This Section provides definitions, and specifies procedural and administrative requirements for compliance with governing regulations and the codes and standards imposed upon the Work. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.

1.2 DEFINITIONS

A. General Explanation:

Definitions and explanations contained in this Section are not necessarily complete or exclusive, but are general for the Work to the extent they are not stated more explicitly in another element of the Contract Documents. More detailed definitions may be included elsewhere in the Specifications and on the Drawings.

B. Approve:

Where used in conjunction with the Owner's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of the word "approved" is held to the limitations of the Owner's responsibilities. "Approval" by the Owner does not release the Contractor from the responsibility to fulfill the requirements of the Contract Documents.

C. Architect or Engineer: THP Limited Inc.

D. Base Contract:

"Base Contract" means the original contract between the Contractor and the Owner for this project. "Base Contract" includes the parts of the Work therein, including Alternates and Unit Prices accepted by the Owner at the time of Contract Award.

E. Bid Submission Document:

Document or form that must be completed and submitted with the Bid. These documents and forms are typically identified in Section 001000 by a box across the top of the first page of the document or form.

F. City: The City of Cincinnati, Ohio.

G. Construction Manager: Messer Construction Co./MBJ Consultants Inc.

H. County: The County of Hamilton, or its authorized agent.

I. Completion, Final:

“Final Completion” refers to the degree of completion at which time the Project as a whole is turned over for full use to the Owner and the Work is completed in compliance with the Contract Documents.

J. Completion, Substantial:

“Substantial Completion” means the date of the “Certificate of Substantial Completion” issued by the Owner when construction is sufficiently complete in accordance with the Contract Documents so the Owner may occupy the Work or a portion of the Work for the intended use.

K. Conditions of the Contract:

General Conditions, and the Drawings and Specifications, including Division 01, Addenda, Clarifications, Change Orders, and Field Orders issued as part of the Work.

L. Construction Documents:

“Construction Documents” means the Drawings, Project Manual including Division 01, Addenda, Clarifications, Change Orders, Field Orders and related documents that address the Work.

M. Contractor:

The terms “Contractor” and “Trade Contractor” shall have the same meaning. “Contractor” and “Trade Contractor” are used interchangeably.

N. Contract Documents:

“Contract Documents” has the identical meaning as “Conditions of the Contract”.

O. Contract Time, Total:

“Contract Time” has the identical meaning as “Total Contract Time”.

P. Day(s):

Except where stated as meaning business day(s), “day(s)” mean(s) calendar day(s).

Q. Development Manager: Not applicable in Phase 3B.

R. Directed, Requested, Approved, etc.:

Terms “directed”, “requested”, “authorized”, “approved”, “required”, “accepted”, and “permitted” mean “directed by the Owner”, “requested by the Owner”, and similar phrases. Phrases’ meanings do not expand the Owner’s responsibility into the Contractor’s areas of construction supervision and safety.

S. Furnish:

“Furnish” means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.

T. Indicated:

“Indicated” is a cross-reference to graphic representations, notes or schedules on Drawings, to other paragraphs or schedules in the Specification, and to similar means of recording requirements in the Contract Documents. Where “shown”, “noted”, “scheduled” and “specified” are used in lieu of “indicated”, it is for the purpose of helping the reader of the Drawings and Specifications locate the cross-reference. “Indicated” does not imply limitation of location except as specifically noted.

U. Install:

“Install” describes operations at the project site, including unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

V. Installer:

“Installer” is the entity engaged by a Contractor, Subcontractor, or sub-Subcontractor for performance of a particular unit of work for the project, including installation, erection, application and similar required operations. It is a general requirement that the entities be expert in the operations they are engaged to perform.

W. Manufacturer’s Recommendations:

“Manufacturer’s recommendations”, and variations thereon, means manufacturer’s recommendations found in publications commonly available to and used by the architectural and engineering professions.

X. Project Site:

“Project Site” is the space available to the Contractor; and refers to the area where the Contractor performs the on-site Work.

Y. Provide:

“Provide” means furnish and install, complete and ready for the intended use.

Z. Regulations:

“Regulations” includes laws, statutes, ordinances and lawful orders issued by governing authorities; and the rules, conventions and agreements within the construction industry which control the performance of the Work, regardless of whether or not they are lawfully imposed by governing authority.

AA. Remove:

"Remove" means to remove and legally dispose of indicated items off-site.

BB. Total Contract Time:

“Total Contract Time” is the time period allotted for the Work, subject to limitations described in the Contract Documents.

1.3 INDUSTRY STANDARDS

A. General Applicability of Standards:

1. Except to the extent that more explicit or more stringent requirements are in the Contract Documents, applicable standards of the construction industry have the same force and effect (and are made a part of the Contract Documents by reference) as if bound directly into the Contract Documents.
2. Refer to Contract Documents for resolution of overlapping and conflicting requirements that result from the application of several different industry standards to the same unit of work.
3. Refer to individual unit of work Sections for specialized codes and standards the Contractor must keep at the project site available for reference by the Owner.
4. Referenced standards (referenced directly in the Contract Documents or by governing regulations) have precedence over non-referenced standards which are recognized in the industry and which may be applicable to the Work.
5. Non-referenced standards recognized in the construction industry, except as otherwise limited in the Contract Documents, are applicable to the Work, and will be enforced for the performance of the Work. Owner will determine if an industry code or standard is applicable to the Work, or which of several standards are applicable to the Work.

B. Publication Dates:

Except as otherwise indicated, where compliance with an industry standard is required, comply with the standard in effect as of the date of the Construction Documents.

C. Copies of Standards:

1. A requirement of the Contract Documents is that each entity performing work be

experienced in that part of the Work being performed, and that the entities be familiar with recognized industry standards applicable to the Contractor's parts of the Work. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed for proper performance of the Work, obtain copies directly from the source.
 3. Though certain copies of standards needed for enforcement of the requirements may be required submittals, the Owner reserves the right to require the Contractor to submit other copies of the standards as necessary for enforcement of the requirements.
- D. Failure to be informed of the requirements of standard specifications is not cause for additional compensation.
- E. In case of conflict between the published standard and Project Specifications, the more stringent governs.
- F. Where applicable, Construction Document references to technical societies, organizations and other construction entities is in accordance with the following abbreviations:

AIA.....	American Institute of Architects
ACI.....	American Concrete Institute
AIEE.....	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
ISI.....	American Iron and Steel Institute
ANSI	American National Standards Institute
ASHRAE	American Society of Heating, Refrigeration and
.....	Air-Conditioning Engineers
ASME.....	American Society of Mechanical Engineers
ASRE.....	American Society of Refrigeration Engineers
ASTM.....	American Society of Testing Materials
AASHTO	American Association of State Highway
.....	& Transportation Officials
AWSC.....	American Welding Society Code
AWWA.....	American Water Works Association
CCS	City of Cincinnati Supplement to ODOT
COBC	Cincinnati Ohio Building Code
CRSI	Concrete Reinforcing Steel Institute
DOP	City of Cincinnati Department of Purchasing
FS	Federal Specification
IPCEA.....	Insulated Power Cable Engineers Association
MIL.....	Military Specification
NBFU.....	National Board of Fire Underwriters
NBS	National Bureau of Standards
NFPA	National Fire Protection Association
NEC	National Electric Code

NEMA National Electric Manufacturers Association
ODOT Ohio Department of Transportation
SAE..... Society of Automotive Engineers
SPR Simplified Practice Recommendation
SSPC..... Steel Structures Painting Council
SWRI Sealant, Waterproofing & Restoration Institute
UL Underwriter's Laboratories

1.4 REGULATORY REQUIREMENTS

- A. Applicable Codes: The “Cincinnati Ohio Building Code” as administered and modified by the Department of Buildings and Inspections, City of Cincinnati, governs the work in addition to other code authorities.
- B. Adherence to Codes and Regulations:
 - 1. Before proceeding with the Work, review Drawings and Specifications for applicable laws, ordinances, rules and regulations.
 - 2. Comply with the applicable laws, ordinances, rules and regulations unless notice is given to the City of Cincinnati, Department of Buildings and Inspections in writing of the discrepancy before proceeding with the Work.
- C. Inspections by Governing Agencies:
 - 1. Before covering up work required to be inspected, arrange for inspections and tests of the installation as required by Governing Authorities and by Specifications.
 - 2. Provide necessary tools, equipment and personnel to conduct the required tests, and notify the City of Cincinnati, Department of Buildings and Inspections at least three (3) business days in advance of scheduled inspections and tests.
 - 3. Submit approved certificate of inspection from the Governing Authority to Owner and Construction Manager before request for final payment.
- D. Requirements of Regulatory Agencies:
 - 1. Construction Manager will make application and pay for the City of Cincinnati Demolition Permit, Foundation Permit, and General Building Permit.
 - 2. Each Contractor and Subcontractor is responsible for obtaining other permits and inspections required for their work by laws, ordinances, rules and regulations, including final certificates, inspections, etc.

PART 2 MATERIALS

Not used.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
BB6 – February 21, 2020
THP #98090.38

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 015000

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Purpose and applicability of this Section:
 - 1. This section augments the General Conditions. References herein to specific articles in General Conditions shall not be interpreted as all-inclusive. Contractors shall review entire General Conditions for other related requirements that apply. Unless otherwise noted, the requirements of this Section applies to building sites.
 - 2. This Section applies to the entire Project. Refer to Contract Descriptions section in Division 01 for Work included in each Contract. In the event of conflict, consult with Construction Manager prior to bid date. Refer to Instructions to Bidders.
- B. Section includes:
 - 1. Utility, fuel and water costs.
 - 2. Temporary electric.
 - 3. Temporary heating, ventilating and air conditioning.
 - 4. Temporary water.
 - 5. Temporary sanitation facilities.
 - 6. Temporary portable fire protection equipment.
 - 7. Construction hoists and use of Owner's elevators and stairs.
 - 8. Protection of persons.
 - 9. Temporary enclosure of exterior openings.
 - 10. Protection of surfaces.
 - 11. Temporary partitions.
 - 12. Removal, storage and replacement of building components.
 - 13. Temporary access and parking.
 - 14. Field office.
 - 15. Containers for waste materials.
 - 16. Recycling.
 - 17. Cleaning during construction.
 - 18. Removal of temporary facilities.

1.2 UTILITY, FUEL AND WATER COSTS

- A. **Each Trade Contractor** will arrange for payment of utility, fuel and water costs required for construction purposes, both for temporary units throughout the duration of the Contract. The cost of tap fees and other installation costs for temporary utilities shall be paid by the Trade Contractor requiring such temporary service. All utility taps shall be coordinated with the Construction Manager.
- B. Trade Contractors shall not waste utilities, fuel and water by unnecessary running of equipment and other unnecessary or wasteful actions.

1.3 TEMPORARY ELECTRIC

- A. **Each Trade Contractor** is responsible for its own temporary electric for this Bid Package.

1.4 TEMPORARY HEATING, VENTILATING AND AIR CONDITIONING

- A. **Trade Contractor (TC-05)** is responsible to provide filtration on the existing air intakes or exhaust louvers where indicated on the plans. Maintenance of the filters including cleaning and/or replacement shall be included as identified in the trade contract work scope.

1.5 TEMPORARY WATER

- A. **Each Trade Contractor** is responsible for its own temporary water for this Bid Package.

1.6 TEMPORARY SANITATION FACILITIES

- A. **Trade Contractor (TC-05)** shall provide temporary chemical-type facilities, (2) units at each of the (4) gate locations, cleaned weekly, and placed where directed by Construction Manager. The chemical-type facilities shall remain on site for duration of work under this Trade Contract. Coordinate with the Construction Manager prior to removal of the chemical-type facilities.

1.7 TEMPORARY PORTABLE FIRE PROTECTION EQUIPMENT

- A. **Each Trade Contractor** shall provide temporary portable fire protection equipment to meet the requirements of codes referenced in Division 1; keep equipment accessible at all times in compliance with codes.

1.8 CONSTRUCTION HOISTS

- A. **Each Trade Contractor** shall provide, operate and maintain portable lifts, hoists and other equipment as necessary to vertically transport equipment, personnel and material required by that Trade Contractor. Comply with all codes referenced in the Contract Documents for such equipment. Coordinate the use of such equipment prior to mobilization on site with the Construction Manager.

1.9 PROTECTION OF PERSONS

- A. **Each Trade Contractor** shall each provide temporary construction, such as protection of openings in floors, barricades at open excavations, and protection of other hazardous conditions, for each of their respective portions of the Work, to ensure compliance with requirements of General Conditions, and Applicable Codes and Regulatory Agencies specified in Section 011100, for protection of persons throughout Contract Time. Coordinate protection through Construction Manager.
- B. Refer to other sections of Specifications for further requirements for protection of persons.

1.10 TEMPORARY ENCLOSURE OF EXTERIOR OPENINGS

- A. Not required for this Bid Package.

1.11 PROTECTION OF SURFACES

- A. **Each Trade Contractor** shall protect items, exposed unfinished surfaces and finish

surfaces as specified below. If items, exposed unfinished surfaces or finish surfaces are stained, discolored, damaged, or otherwise rendered in unacceptable or unusable condition, as determined by Construction Manager and Architect, restore to new condition or replace, to satisfaction of Construction Manager and Architect, with materials approved by Construction Manager, Architect, and manufacturer of items, exposed unfinished surfaces and finish surfaces being restored.

1.12 TEMPORARY PARTITIONS

- A. **Trade Contractor (TC-05)** shall provide barricades in accordance with the construction documents and shall include a chain at each door or gate for securing with a lock provided by the CM.

1.13 REMOVAL, STORAGE AND REPLACEMENT OF EXISTING BUILDING COMPONENTS

1.14 TEMPORARY ACCESS AND PARKING

- A. Personal and Company vehicle parking shall be off-site and paid for by each Contractor, with no additional charges to Owner.

1.15 FIELD OFFICE/TOOL TRAILER

- A. Tool Trailer locations to be coordinated with the Construction Manager.

1.16 CONTAINERS FOR WASTE MATERIALS

- A. All Trade Contractors are to provide their own means for removal of construction materials from the site.

1.17 CLEANING DURING CONSTRUCTION

- A. **Each Trade Contractor** is responsible for **daily** cleanup and disposal of all debris associated with its work activities. Debris not removed by the Trade Contractors will be discarded at the delinquent Trade Contractor's expense. These expenses will be billed at an hourly rate of \$250/hr/person, plus any additional requirements such as hoisting, dumpster, misc. equipment rental and other related work.

1.18 REMOVAL OF TEMPORARY FACILITIES

- A. When temporary facilities are no longer required, remove them from Site. Unless otherwise specified herein, all such facilities shall be removed before Substantial Completion. Removal shall be performed by Trade Contractor who provided the temporary facilities as specified herein.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 017329

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Requirements for all cutting (including excavation), fitting and patching required to:
 - 1. Cut and patch as needed at interface of new work at existing construction.
 - 2. Uncover portions of the Work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work or work not conforming to requirements of Contract Documents.
 - 4. Remove samples of installed work as specified for testing.
- B. Refer to General Conditions also.

1.2 SUBMITTALS

- A. Requests for Construction Manager's Consent:
 - 1. Prior to cutting that affects structural safety, submit written request to Construction Manager for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify Construction Manager and secure its written permission and the required change order prior to proceeding.
- B. Notices to Construction Manager:
 - 1. Prior to cutting and patching performed pursuant to Construction Manager's instructions, submit cost estimate to Construction Manager. Secure Construction Manager's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
 - 2. Submit written notice to Construction Manager designating the time work will be uncovered, to provide for Construction Manager's observation.

1.3 QUALITY ASSURANCE

- A. Coordinate with work of other Contractors and subcontractors to minimize cutting and patching.

- B. Perform cutting and patching with adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are familiar with the specified requirements and methods needed for proper performance of the work.
- C. Patching shall match the adjacent surfaces, shall meet code requirements, and shall be performed by trade specializing in the work requiring patching.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with Sections and standards for each specific product involved.

2.2 PAYMENT FOR COSTS

- A. Owner will reimburse Contractor for cutting and patching performed pursuant to a written change order, after claim for such reimbursement is submitted by Contractor. Perform other cutting and patching needed to comply with Contract Documents at no additional cost to Owner.
- B. Any cost caused by defective or ill-timed work shall be borne by the party responsible for same.

PART 3 EXECUTION

3.1 PREPARATION

- A. Inspect existing conditions of the Project Site, including elements subject to damage or movement during cutting and patching.
- B. Provide adequate temporary support as necessary to assure the structural value or integrity of affected portion of work.
- C. Provide devices and methods to protect other portions of the Project from damage.
- D. Provide protection from weather, exposure, etc for that portion of the Project that may be exposed by cutting and patching work.

3.2 INSTALLATION

- A. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- C. Execute fitting and adjustment of products to provide a finished installation to comply

with specified products, functions, tolerances and finishes.

- D. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- E. Where new work requires cutting and patching of existing conditions, patch adjacent areas and interface new work with existing to provide a finished construction of like materials, finishes, quality and function at the existing conditions. Make all repairs and patches, fillings, etc., to the satisfaction of Owner, Construction Manager, and Architect.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES AND SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project requirements to be fulfilled near the end of Contract Time in preparation for final acceptance and occupancy of the Work by the Owner.

1.2 RELATED SECTIONS

- A. Section 007200 - General Conditions.
- B. Section 013300 - Submittals.
- C. Section 014000 - Quality Requirements.
- D. Section 015000 - Construction Facilities and Temporary Controls.
- E. Specific additional requirements for individual units of Work are included in the associated Specifications Sections.

1.3 COORDINATION

- A. Each Contractor and subcontractor shall comply with provisions of this Section.
- B. Subcontractors shall make all submittals and requests specified in this Section to Contractor as required. Contractor shall:
 - 1. Keep a log of all submittals and requests.
 - 2. Review all submittals and requests.
 - 3. Transmit submittals and requests to Construction Manager with a cover letter itemizing all submittals and requests being transmitted along with a statement indicating for each item Contractor's best judgment as to the appropriateness of the submittal or request.

1.4 QUALITY ASSURANCE

- A. Prior to requesting inspection, Contractor shall review Work and confirm that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.5 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. General: Before requesting inspection for Certificate of Substantial Completion, either

for all the Work or for portions of the Work, complete the following items. List known exceptions in the request.

1. Items required for Substantial Completion per Section 007200.
2. In the progress payment request that coincides with, or is the first request following the date Substantial Completion is claimed, show either 100% completion for the portion of the Work claimed as substantially complete, or list incomplete items, the value of incomplete work, and the reasons for the incomplete work. Include supporting documents for completion that are required by the Contract Documents. Include a statement showing an accounting of changes to the Contract Sum to date.
3. Advise the Owner and Construction Manager of pending insurance change-over requirements and provisions for continuing the performance bond through the warranty period.
4. Submit operations, maintenance and data manuals, and materials, including spare and replacement parts and special maintenance tools, if required by manufacturer for proper maintenance.
5. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents for those items whose warranties, guarantees, bonds, etc. commence on the date of Substantial Completion.
6. Discontinue or change over and remove temporary facilities and services from the Project Site, along with construction tools and facilities, and similar elements.
7. Complete cleaning requirements.

B. Inspection Procedures:

1. Upon receipt of Contractor's request for inspection, the Construction Manager and Architect will either proceed with inspection or advise the Contractor of unfilled prerequisites.
2. Following initial inspection, the Construction Manager and Architect will prepare the Certificate of Substantial Completion or will advise Contractor of Work which must be performed before the Certificate can be issued. Construction Manager and Architect will repeat the inspection when requested and when assured that the Work is substantially complete.
3. Results of the completed inspection will form the initial punch list for final acceptance.

1.6 PREREQUISITES TO FINAL COMPLETION

- A. General: Before requesting final inspection for Certificate of Final Acceptance and final payment, complete the following items. List known exceptions, if any, in the request.

1. Items required for Final Completion per Section 007200.
2. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required. Include an updated final statement accounting for final additional changes to the Contract Sum.
3. Submit a copy of the Construction Manager and Architect's final punch list stating that each item is complete or otherwise resolved for acceptance.
4. Submit consent of Surety.
5. Submit evidence of final, continuing insurance coverage complying with the insurance requirements of the Conditions of the Contract.
6. Submit affidavits as required by the Ohio Mechanics lien law.
7. Submit Prevailing Wage Compliance Certificates.
8. Submit Record Documents, final project photographs, damage or settlement survey and similar final record information.

B. Re-inspection Procedure:

1. Construction Manager and Architect will re-inspect the Work upon receipt of Contractor's notice that the Work, including punch list items resulting from earlier inspections, is complete except for those items whose completion was delayed because of circumstances acceptable to the Owner.
2. Upon completion of re-inspection, the Construction Manager and Architect will either prepare a certificate of final acceptance, or will advise Contractor of Work that is incomplete or of obligations not fulfilled, but required for final acceptance.
3. If necessary, the re-inspection procedure will be repeated.

1.7 PROJECT RECORD DOCUMENTS

- A. Provide Record Documents to the Construction Manager for all aspects of the Project.
1. Show all changes from the Contract Documents made during the Work. Unless noted otherwise, indicate changes in red ink on clean black-line prints. Make notations in a neat and legible manner on the prints, with additional explanatory drawings or sketches as necessary.
 2. Submit Record Documents in electronic formats described in Article 9 of the General Conditions and Section 011100 – Summary of Work.
- B. Record Documents shall be complete and incorporate information from

subcontractors. Ensure that Record Documents indicate the following:

1. Correct location of Work items and equipment where it differs from the location shown on Drawings.
 2. Survey information, specifically including new and existing pile locations and new and existing utility documentation.
 3. Specific items and requirements listed in individual specification Sections.
 4. Other information of a pertinent or useful nature.
- C. Submit the completed set of Record Documents as specified in 1.7 above, unless noted otherwise within individual specification Sections.
- D. Refer also to individual specification Sections for specific additional requirements for Record Documents.

1.8 GUARANTEES AND WARRANTIES

- A. Before request for inspection for Substantial Completion, submit to the Construction Manager the certificates of guarantee and warranty required by the Specifications.

1.9 CLOSEOUT PROCEDURES

- A. Except as otherwise indicated or requested by the Construction Manager, remove temporary protection devices and facilities installed during the Work to protect existing or previously completed Work.
- B. Comply with safety standards and governing regulations for cleaning operations. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the Project Site and dispose of in a lawful manner. Where extra materials remain after completion of associated work, dispose of these materials as directed by the Construction Manager.

1.10 PROJECT CLOSEOUT SUBMITTAL CHECKLIST

- A. Each Contractor and subcontractor shall submit to Construction Manager its portion of the following documents, as applicable, in accordance with all requirements of the Contract Documents:
1. Project Record Documents (As-Built).
 2. Operation and maintenance manuals and materials where specified for mechanical and electrical equipment. Provide three (3) hard copies of each manual bound in three-ring binders.
 3. Operation and maintenance data and materials for operating items other than mechanical and electrical equipment, where specified.

4. Maintenance materials and spare parts.
5. Maintenance data and materials for finish materials, where specified.
6. Replacement materials.
7. Special maintenance tools, if required by manufacturer for proper maintenance, or if specified.
8. Guarantees, warranties and bonds.
9. Affidavits.
10. Evidence of compliance with requirements of governing authorities as applicable.
11. Release of liens and other related project closeout data, as indicated in General Conditions.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

DIVISION 02 – EXISTING CONDITIONS

SECTION 024100

DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Protection for structures, utilities, and other improvements that are to remain.
- B. Selective demolition of designated construction.
- C. Removal of materials from site.
- D. Salvage and storage of removed materials.
- E. Abandonment of utilities.

1.2 RELATED SECTIONS

- A. Section 310000 - Earthwork.
- B. Section 316310 – Auger Cast Piles.
- C. Section 321216 – Asphalt Paving.

1.3 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of General Conditions and Section 017700.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable laws, ordinances, and the Cincinnati - Ohio Building Code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal.
- B. Comply with applicable requirements of NFPA Standard No. 241.75 - Safeguarding Building Construction & Demolition Operations.
- C. Obtain required permits from authorities (except for any permits that Construction Manager is responsible for obtaining for the Project – refer to Section 014216).
- D. Notify affected utility companies before starting work and comply with their requirements.

- E. Do not close or obstruct roadways, sidewalks, and hydrants without permits.
- F. Do not close or obstruct egress width to any building or site exit.
- G. Do not disable or disrupt fire or life safety systems without three business days prior written notice to Owner and Construction Manager.
- H. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
- I. Comply with ODOT Construction and Material Specifications and City of Cincinnati Supplement to ODOT Construction and Material Specifications.

1.5 SEQUENCING

- A. Coordinate work with the Construction Schedule and Construction Manager.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PREPARATION

- A. Provide, erect, and maintain temporary barriers and security devices at locations indicated and as required by regulatory requirements. Prevent spread of dust, odors, and noise. Refer to Drawing C104 Erosion Control Plan for additional information.
- B. Protect existing landscaping materials, appurtenances, structures, and utilities which are not to be demolished.
- C. Prevent movement or settlement of adjacent structures.
- D. Notify affected utility companies before starting work and comply with their regulations. Locate utilities prior to starting Work.

3.2 DEMOLITION REQUIREMENTS

- A. Conduct demolition to minimize interference with adjacent structures and utilities.
- B. Conduct operations with minimum interference to public or private accesses. Maintain protected egress and access at all times.
- C. Sprinkle Work with water to minimize dust. Provide water trucks or hoses and water connections for this purpose.

- D. Notify Construction Manager if asbestos-containing materials are encountered during demolition.

3.3 DEMOLITION

- A. Use only procedures that will not damage existing construction.
- B. Do not remove any part of the work that will leave the remaining work unstable.
- C. If deteriorated materials, not intended for removal, are encountered during demolition, stop all work in that area and notify Construction Manager and Owner immediately.
- D. Demolish and remove existing construction only to the extent indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
 - 1. Proceed with demolition systematically.
 - 2. Remove dangerous or unsuitable materials and promptly dispose of off-site.
 - 3. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- E. Remove demolished materials from site, frequently and promptly.
- F. Do not burn or bury materials on site. Leave site in clean condition.
- G. Remove temporary work.

3.4 SURVEY AND DOCUMENTATION OF CONDITIONS

- A. Provide the services of a professional surveyor registered in the State of Ohio. As Work progresses, and before excavations are backfilled, surveyor shall survey and record on Record Drawings the location, elevation, orientation and size of:
 - 1. Utilities, manholes and catch basins encountered.
 - 2. At ends of removed utilities, where a portion of the existing utility is to remain, survey location, size and depth/invert of the utility.
 - 3. Existing piles scheduled to remain and new piles. See Section 316310.
 - 4. Other features encountered and requested to be recorded by the Construction Manager, Architect or Owner.

3.5 ABANDONMENT OF UTILITIES

- A. At ends of removed utilities, where a portion of the existing utility is to remain: fill, cap, seal, and abandon utility in accordance with Utility's requirements and recommendations.

END OF SECTION

SECTION 030100

CONCRETE REPAIRS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. All labor, material, tools, equipment and services to perform concrete repairs at areas indicated on the Drawings and in the Specifications, including but not limited to:
 - 1. Survey existing concrete for damage. Repaired damaged area prior to starting fluid applied water proofing and expansion joints.
 - 2. Concrete slab repairs.
 - 3. Expansion joint blockout repairs.
 - 4. Shallow concrete repairs.

1.2 RELATED SECTIONS

- A. Section 071400 – Fluid Applied Waterproofing.
- B. Section 079000 – Expansion Joints.
- C. Section 079200 - Sealants.

1.3 REFERENCES

- A. American Concrete Institute (ACI):
 - 1. ACI 301 - Specification for Structural Concrete for Buildings.
 - 2. ACI 305R - Hot Weather Concreting.
 - 3. ACI 306R - Cold Weather Concreting.
 - 4. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A185 - Specification for Steel Welded Wire, Fabric, Plain, for Concrete Reinforcement.
 - 2. ASTM A615 - Specification for Deformed and Plain-Billet Steel Bars for Concrete Reinforcement.
 - 3. ASTM A775 – Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

4. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete.
 5. ASTM C33 - Concrete Aggregates.
 6. ASTM C39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.
 7. ASTM C94 - Specification for Ready-Mixed Concrete.
 8. ASTM C143 - Standard Test Method for Slump of Portland Cement Concrete.
 9. ASTM C150 - Specification for Portland Cement Concrete.
 10. ASTM C260 - Specification for Air-entraining Admixtures for Concrete.
 11. ASTM C494 - Specification for Chemical Admixtures for Concrete.
 12. ASTM C881 – Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
 13. ASTM C882 – Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete.
- C. Structural Steel Painting Council (SSPC):
1. Surface Preparation Specification No. 3 (SP3) – Wire Wheel Cleaning.
 2. Surface Preparation Specification No. 6 (SP6) – Commercial Blast Cleaning.
- D. American Association of State Highway and Transportation Officials (AASHTO):
AASHTO M182 - Specifications for Burlap Cloth Made from Jute or Kenaf.
- E. Keep a copy of the referenced specifications cited in this section in the on-site field office.

1.4 SUBMITTALS

- A. Submit literature for manufactured products, including manufacturer's specifications, test data and installation instructions.
- B. Letter stating this Contractor and supplier are familiar with the referenced standards.
- C. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.

- D. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks before the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the project.
 - 1. Submitted mix design shall address weather conditions which are expected to occur during the concrete repair phases. Concrete mixes shall not only be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.
- E. Provide the following in accordance with ACI 301.
 - 1. Mill test for cement.
 - 2. Admixture certification.
 - 3. Aggregate certification.
 - 4. Procedure for adding water to ready-mix at site, including method of measuring water.
 - 5. Method of adding admixtures.
 - 6. Materials and methods for curing.
 - 7. Ready-Mix delivery tickets.
 - 8. Certificate of Conformance for concrete production facilities by NRMCA (National Ready Mix Contractors Association).
 - 9. Field and laboratory tests that are the Contractor's responsibility.
- F. The Owner's review of details and construction operations shall not relieve this Contractor of his responsibility for completing the work successfully in accordance with the Contract Documents.

1.5 QUALITY ASSURANCE

- A. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

- B. Concrete that does not conform to the specified requirements, including bond to substrate, strength, finish and tolerances shall be subject to removal and replacement, including necessary preparatory work, at no additional cost to the Owner and without extension to the Contract Time.
- C. Contractor shall be responsible for restoration of other components of the Work damaged during placement of concrete or damaged during removal of unsatisfactory concrete.
- D. ACI 301, ACI 305R and ACI 306R are a part of the Contract Documents, are incorporated herein as fully as if here set forth and are referred to as General Concreting Requirements.
- E. Chloride Ion Limitations: Maximum acid-soluble chloride ion concentration, in hardened concrete shall not exceed .10% by weight of cement.
- F. Concrete testing and certification shall be as described in ACI 301, Chapter 16.

1.6 WARRANTY

- A. A warranty period of two (2) years shall be provided for concrete work performed under this Section against defects, as determined by the Owner, including but not limited to debonding, excessive cracking and surface scaling.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Pre-packed Concrete Materials:
 - 1. Horizontal Application – Typical Repair Areas (Patch Material Type A):
Intended for transfer slab repairs
 - a. MasterEmaco T 310CI by BASF
 - b. SikaQuick 1000 by Sika Corp.
 - c. MasterEmaco T 1060/1061 by BASF
 - d. Planitop 18 ES by Mapei.
 - 2. Vertical and Overhead Repair Areas-Trowel Grade (Patch Material Type B.1):
 - a. MasterEmaco S 488CI by BASF
 - b. SikaQuick VOH by Sika Corp.
 - c. MasterEmaco N 425 by BASF
 - d. Planitop XS by Mapei

- B. Water:
 - 1. Mixing water shall be potable meeting requirements of ASTM C-94.
- C. Bar Coating:
 - 1. Sikadur 32, Hi-Mod LPL by Sika, Inc.
 - 2. MasterEmaco ADH 326 by BASF
- D. Bonding Agent (used for shallow floor patches if the patch is not deep enough for patch anchors; patch material must be placed while epoxy is still wet)
 - 1. Sikadur 32, Hi-Mod LPL by Sika, Inc.
- E. Welded Wire Reinforcement:
 - 1. Conforming to ASTM A185.
- F. Reinforcing Steel:
 - 1. All reinforcing steel shall have a minimum F_y of 60 ksi.
 - 2. Provide epoxy coated steel where shown on Drawings.
- G. Curing Materials:
 - 1. 10 oz. burlap meeting the requirements of AASHTO M-182.
 - 2. Visqueen: 6 mil polyethylene (white).
- H. Curing Compound:
 - 1. VOCOMP-25 by W.R. Meadows.
 - 2. MasterKure CC 1315WB by BASF
 - 3. Liquid membrane forming curing compound shall conform to the requirements of ASTM C1315, Type 1, Class A and have data from an independent laboratory indicating a maximum moisture loss of 0.40 grams per square cm. when applied at a coverage rate of 300 square feet per gallon.
- I. Form Lumber:
 - 1. New fire retardant material, grade and size to adequately form, support and brace concrete and to provide finishes that match adjacent surfaces.
- J. Epoxy Grout:
 - 1. Sikadur 32, Hi-Mod LPL epoxy mixed with silica sand.

K. Patch Anchors:

1. Stainless steel spikes by Powers Rawl.

PART 3 EXECUTIONS

3.1 GENERAL

- A. Prior to the start of work, the Contractor shall survey areas to receive repair concrete to determine locations and approximate quantity of material.
- B. Prior to start of excavations, perform an on-site review of the work areas with the Owner. Provide a minimum of 2 working days notice prior to the requested review day.
- C. Prior to performing operations such as jack hammer work, the Contractor shall make a careful and thorough survey of the underside of the level on which he intends to work and shall remove all loose soffit concrete which may fall as a result of those operations. The Contractor shall also be responsible for posting all signs and erecting all barricades as necessary to prevent pedestrians and vehicles from entering the area below hazardous work.
- D. During concrete removal work, Contractor shall not damage existing mild steel reinforcement. Mild steel reinforcement that is damaged by the Contractor, as determined by the Owner, shall have a new reinforcing bar the same size as the damaged bar lapped to each side of the damaged area. Lap lengths shall be determined by ACI 318. Cost of new reinforcing bar, concrete removal and patching for lap length shall be borne by the Contractor.
- E. It is intended that the existing reinforcement steel exposed during the work shall remain in place (unless noted on Drawing for removal) and undamaged during removal of the unsatisfactory concrete. Tie loose reinforcement bars in place in an approved manner prior to placing patch mix. If the reinforcement is deteriorated, as determined by the Owner, the Owner may direct that it be replaced and spliced in accordance with ACI splice and development requirements for reinforcement bars. Additional concrete removal may be required to expose undamaged reinforcing. If required, compensation will be made in accordance with the established Unit Prices.
- F. Concrete placement for patches or overlays on sloping surfaces shall begin on the low elevation end and proceed upwards to the high elevation end.
- G. Control joints to be either tooled or sawed into concrete slab. Confirm control joint pattern with Owner prior a minimum of 24 hours prior to placement of concrete. Tooled joints are to be cut while concrete is wet. Sawed joints to be cut within 6 hours of slab placement before slab begins to crack.

3.2 PROTECTION

- A. Contractor shall protect all open excavations, and reinforcing therein, from damage due to mechanical disturbance, weather conditions or other causes.
- B. Contractor shall protect occupied areas below the work area during all phases of the work including removal, preparation and placement of materials.
- C. Provide barricades to close areas immediately below the work area. Coordinate the time closing of required areas with the Owner.

3.3 SHALLOW, DEEP AND FULL DEPTH FLOOR REPAIR PROCEDURE

- A. Refer to the Drawings for repair details. Contractor shall sound the concrete deck using chain drag method and hammer survey to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner's representative.
- B. Remove floor concrete within the Work Area by conventional chipping methods.
- C. Conventional Chipping Method:
 - 1. Sawcut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of sawcuts shall be 3/4 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.
 - 2. Perform concrete removal with no larger than 18 pound chipping hammers.
 - 3. Begin concrete removal at the center of the removal area and work towards the sawcut perimeter. Maintain vertical sawcut edge at perimeter. Re-saw if necessary to maintain required edge.
 - 4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.
- D. The surface of the sound, exposed concrete shall be relatively flat with 1/4" amplitude over the repair area for new concrete patches and overlays. Contractor is responsible for insuring that the final concrete repair area is sound.
- E. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.
- F. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.

- G. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.
- H. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.
- I. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate or allow coating to puddle in low areas of excavation.
- J. Thoroughly saturate all concrete surfaces to be in contact with new concrete as necessary to provide a saturated surface dry condition.
- K. Just prior to concrete placement blow-down area with oil-free compressed air to remove standing and puddled water.
- L. Place Patch Material Type A or Type B in the excavations. Vibrate new patch material to ensure consolidation in maximum-depth areas and at the excavations perimeter. Screed material flush with adjacent surfaces and finish with a float or light trowel.
- M. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.
- N. Cure Patch Material Type A in accordance with manufacturer's written instructions.

3.4 OVERHEAD AND VERTICAL REPAIR PROCEDURE

- A. Refer to the Drawings for repair details. Contractor shall sound overhead and vertical concrete surfaces using hammer sounding techniques to identify the limits of deteriorated concrete within the Work Area. Mark with paint each area to be repaired. Location of paint marks must be approved by the Owner's representative.
- B. Before removal of overhead or vertical concrete within a Work Area, the Contractor and the Owner's representative will record the area bounded by the paint marks. Take measurements to the nearest inch in such a way that results in a total plan area at each location.
- C. Contractor and Owner's representative shall affix their signatures to each measurement sheet completed, attesting to the agreed-upon accuracy of the measurements. Furnish copies of measurement sheets to both parties for their records.
- D. Calculate and sum the total repair area to yield total square feet. Measurements are the sole basis for calculation of final payment, based upon the item's unit price. Refer to Section 012100 and Section 012900. Base unit price on the area of the repair and the depths indicated on the repair details.
- E. Remove concrete within the Work Area by conventional chipping methods.

F. Conventional Chipping Method:

1. Saw cut the concrete surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of saw cuts shall be 1/2 inch. Cut perimeter of removal area before beginning chipping hammer work. Do not over cut corners of patch area.
 2. Perform concrete removal with no larger than 18-pound chipping hammers.
 3. Begin concrete removal at the center of the removal area and work towards the saw cut perimeter. Maintain vertical saw cut edge at perimeter. Resaw if necessary, to maintain required edge.
 4. Contractor shall use due diligence to perform concrete chipping operation in a manner to avoid punching through a slab. Means such as utilizing wide chipping blades and performing chipping procedures on a low angle are recommended.
- G. The surface of sound, exposed concrete shall be relatively flat with a 1/4" amplitude over the repair area. Contractor is responsible for ensuring that the final concrete repair area is sound.
- H. Within 24 hours of concrete repair material placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.
- I. After completion of all cleaning operations, blow-out excavations with oil-free and water-free compressed air. Previously cleaned excavations that are subjected to contamination must be re-cleaned.
- J. The Owner will inspect excavations prior to coating reinforcing steel. Final touch-up of excavations and reinforcing steel shall be performed before proceeding.
- K. Within 8 hours after cleaning, coat all surfaces of exposed steel with one coat of bar coating. Allow coating to become tack free before proceeding with second coat.
- L. Apply second coat of bar coating to previously coated steel. Do not apply coating to substrate.
- M. Maintain all concrete surfaces of repair areas in a wet condition to provide a surface saturated dry condition.
- N. Just prior to material placement, blow-down area with oil-free compressed air to remove any standing water near vertical repair locations.
- O. Place Patch Material Type B in the excavations per manufacturer's written instructions. Vibrate new patch material at vertical repairs to ensure consolidation in maximum-depth areas. Screed material flush with adjacent surfaces and finish with a light trowel.

P. After finishing, fog concrete surfaces with water using approved fog spray device (hose not permitted) to prevent surface drying prior to start of curing.

Q. Cure Patch Material Type B in accordance with manufacturer's written instructions.

3.5 EPOXY GROUT INSTALLATION PROCEDURE

A. Saw cut the concrete deck surface along the perimeter of the paint marks which define the removal area. Do not cut existing reinforcement. Depth of saw cuts shall be $\frac{3}{4}$ inch. Cut perimeter of removal area before beginning chipping hammer work.

B. Begin concrete removal at the center of the removal area and work towards the saw cut perimeter. Maintain vertical saw cut edge at perimeter. Resaw if necessary, to maintain required edge.

C. Prior to epoxy grout placement, media blast the excavation and the immediately adjacent surface. Reinforcing steel shall be cleaned to a SSPC-SP6 condition unless otherwise indicated.

D. Mix epoxy mortar using 2 parts epoxy and 1 part clean over dried silica sand.

E. Apply neat epoxy worked into substrate for positive adhesion. Immediately follow with application of the epoxy mortar. Follow manufacturer's instructions for mixing and installation.

F. Do not allow traffic on epoxy mortar patch for a minimum of 24 hours.

3.6 FIELD QUALITY CONTROL

A. All excavations shall be inspected and approved prior to placing concrete. The Contractor shall notify the Owner 2 working days in advance of required inspection.

B. Notify the Owner at least 2 working days prior to placing concrete.

C. Acceptance of Structure:

1. Acceptance of Structure shall be in accordance with ACI 301 Chapter 18.

2. Contractor shall bear all costs of correcting rejected work, including the cost of Owner's services thereby made necessary.

3.7 CLEANING

A. Empty containers shall be removed from the Garage at the end of each working day. Cloths soiled with adhesive materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage of disposal of flammable materials. Comply with health, fire and environmental regulations.

- B. All spilled materials shall be completely removed from hardware, adjacent floor areas, metal work, etc. Remove spilled coating by approved methods.
- C. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation of adhesive materials installations.
- D. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dust, dirt and debris.

END OF SECTION

SECTION 03 30 00
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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

- 1. All labor, materials, equipment, special tools and services to complete cast-in-place concrete work required for the Project, as herein specified, and as indicated on the Drawings.

B. Related Sections:

- 1. Section 220504 – Basic Plumbing Materials and Methods: Sleeve Placement Coordination Drawings.
- 2. Section 220507 – Piping Materials & Methods: Sleeve Material & Installation.
- 3. Section 221319 – Drainage Systems Specialties: Drains.
- 4. Section 310000 – Earthwork.
- 5. Section 316310 – Auger Cast Piles.

1.3 REFERENCES

- A. A copy of each reference shall be kept in the field office for the duration of the project. The reference standards shall govern the work except as modified herein.
- B. American Concrete Institute (ACI) 301-16 Specifications for Structural Concrete is hereby incorporated as part of this Section. Supplemental requirements and modifications listed herein take precedence over the requirements of ACI 301. All ACI 301 items unless modified by the Contract Documents are incorporated as written. When any part of any item is modified or voided, the unaltered provisions of the part shall apply as written.
- C. ACI 305.1-14 Specification for Hot Weather Concreting.
- D. ACI 306.1-90 Standard Specification for Cold Weather Concreting.
- E. The ACI MNL-15(16) Field Reference Manual.
- F. Other ACI references as noted in this Section.

- G. American Association of State Highway and Transportation Officials (AASHTO) Specifications as noted in this Section.
- H. ASTM International (ASTM) Specifications as noted in this Section.
- I. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, 28th Edition.
- J. National Ready Mixed Concrete Association (NRMCA) Quality Control Manual.

1.4 SUBMITTALS

A. General.

1. Shop drawings shall be produced by the Contractor and submitted to the Architect/Engineer for review. The Architect/Engineer will endeavor to complete review of a shop drawing submittal within 14 days of receipt of the submittal. Fabrication of material prior to the receipt of approved shop drawings for that material shall be at the Contractor's risk.
2. The Contractor is responsible to furnish field-verify information, coordinate material requirements, and review shop drawings prior to submittal of shop drawings to the Architect/Engineer. Receipt of shop drawings by Architect/Engineer will be an assumption by Architect/Engineer that this has been done.
3. Notations by the Architect/Engineer made on the shop drawings do not authorize additional compensation for the Contractor.
4. The Contract Documents (Drawings and Specifications) govern all concrete work. Errors on shop drawings or discrepancies between shop drawings and Contract Documents shall be governed by the Contract Documents. Even if shop drawings contain errors after review by the Architect/Engineer, no additional compensation is due Contractor to correct work to what is shown on Contract Documents.
5. Architectural and mechanical drawings supplement the structural drawings. Requirements for concrete work may be shown on architectural and mechanical drawings.
6. The Architect's and Engineer's review of details and construction operations shall not relieve the Contractor of responsibility to successfully complete the work in accordance with these Specifications and within the Contract time.
7. Shop drawings may be received and returned electronically. If paper copies are submitted no more than two copies will be returned to the Contractor or Construction Manager.

- ##### B. Submit mix designs and test results conforming to the requirements of Section 4 of ACI 301. Submit request for approval to use admixtures, if any. A complete mix design submittal must be furnished at least three weeks prior to the planned use of that mix. The Contractor is cautioned to undertake mix design preparation and submittal procedures immediately after authorization to proceed with the Project.

1. The submitted mix designs shall address weather conditions that are expected to occur during the concrete construction phase. Concrete mixes shall not only

be designed for average temperature and humidity conditions, but also for adverse conditions (hot and cold weather), as applicable to this project.

- C. Submit letter stating that concrete subcontractors and suppliers are familiar with the reference standards.
- D. Submit a Quality Control Plan in accordance with Section 1 of ACI 301.
- E. Submit reinforcing steel shop drawings in accordance with Section 3 of ACI 301.
- F. Submit formwork shop drawings for record only. For multistory construction submit record calculations of shoring and reshoring loads sealed by a professional engineer licensed in the state where the Project is located. Design and inspection of formwork for structural adequacy is the Contractor's responsibility. Prior to submittal, formwork shop drawings shall be reviewed by the Contractor's registered professional engineer.
- G. For exposed-to-view concrete work submit formwork shop drawings for architectural review of formwork factors affecting appearance of the completed Work, including types of forms, ties, finishes, and joint types and locations. Review is for general architectural applications and features only.
 - 1. Where the finish is to match a reference sample, reproduce a mockup of the sample in a location approved by the Architect. Obtain acceptance of mockup before proceeding with that finish in the locations designated on the Drawings.
- H. Submit procedures and records required in hot and cold weather concreting work.
- I. Submit documentation that epoxy coating applicator is certified under the Concrete Reinforcing Steel Institute's Fusion-Bonded Epoxy Coating Applicator Plant Certification Program.
- J. Submit the following certifications:
 - 1. All coating, floor covering and surface treatment manufacturer's approvals (in writing) of concrete curing compounds that are not removed prior to the product's installation.
 - 2. Subsequent treatment manufacturers' approvals (in writing) of form release agent.
- K. Submit the following product samples for review:
 - 1. Samples of form(s) to be used for exposed-to-view concrete.
- L. The following submittals shall be provided in accordance with ACI 301 and Division 01 - General Requirements.
 - 1. Contractor's proposed Testing Agency.
 - 2. Field and Laboratory tests that are the Contractor's responsibility.
 - 3. Data and test documentation on proposed materials including but not limited to:
 - a. Cement.
 - b. Aggregates.
 - c. Admixtures.
 - d. Reinforcing.

- e. Curing materials.
- f. Related materials for concrete construction specified herein.
- g. Material for repair of surface defects if other than site-mixed portland-cement mortar.
- 4. Construction joints not shown on the drawings.
- 5. Method of developing bond at joints (except slabs on grade).
- 6. Method of adding admixtures.
- 7. Procedure for adding water to ready-mixed concrete at site, including method of measuring water.
- 8. Method(s) for preserving moisture in the concrete.
- 9. Ready-mixed concrete delivery tickets.
- 10. Thermal control plan for all mass concrete placements.
- M. Submit Certificate of Conformance for concrete production facilities by NRMCA.
- N. Submit documentation of all flatwork finishers and flatwork supervisors' certifications.

1.5 QUALITY ASSURANCE

- A. Regulatory requirements:
 - 1. Comply with applicable laws, ordinances, and the Ohio Building Code (OBC).
 - 2. Comply with the referenced ACI publications, as modified and supplemented in this Section.
- B. Tests and inspections:
 - 1. The Owner will employ a Geotechnical Engineer to inspect and approve foundation bearings and backfill compaction. Do not place concrete until subgrade approvals have been obtained.
 - 2. The Owner will employ a testing and inspection agency to provide the services specified in Section 1.6.3 of ACI 301, including supplemental requirements defined in Article 1.8 of this Specification.
 - 3. The Contractor shall select an independent testing agency, subject to the Architect/Engineer's approval, to perform all testing required by the Contractor for qualification of proposed materials and the establishment of mix designs, for his use in determining concrete strengths for early form removal, and for all other testing services needed or required by the Contractor.
- C. Flatwork finishers certification:
 - 1. All flatwork finishers must be ACI Concrete Flatwork Technician certified.
 - 2. The on-site flatwork supervisor must be ACI Concrete Flatwork Finisher and Technician certified.
- D. Ready-Mixed Plant Certification:
 - 1. All ready-mixed concrete production facilities shall be certified by the NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities.
- E. Pre-concrete construction Meeting:

1. A preconstruction meeting shall be arranged by the Contractor to review concrete pre-placement and placement activities, inspection and testing requirements, formed and unformed concrete finishes, hot and cold weather concreting procedures, form removal, critical tolerances, and acceptance procedures for architectural concrete.
2. Ready-mix supplier, Contractor, concrete finishers, Construction Manager, Owner's concrete testing agency, and Architect/Engineer shall attend.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to the project site bundled, tagged and marked. Use durable tags indicating bar size, lengths, etc., and other information corresponding to markings shown on placing drawings.
- B. All reinforcement at the site shall be stored off the ground and protected from damage, accumulation of dirt and excessive rust.
- C. Comply with CRSI "Field Handling Techniques for Epoxy-Coated Rebar at the Job Site" and as modified by this Section.
- D. All formwork at the site shall be stored in a clean, dry location off the ground, covered and protected from damage and accumulation of dirt, etc.

1.7 SUBSTITUTIONS

- A. Requests for product substitutions must be submitted for review and approval, with all necessary documentation, a minimum of 10 days before bids are due. Product substitutions will only be permitted if incorporated into the bid documents by addendum.

1.8 SUPPLEMENTAL REQUIREMENTS AND MODIFICATIONS TO ACI 301-16

- A. The following statements modify and supplement ACI 301. All unaltered parts of ACI 301 shall apply as written.
- B. The Section and paragraph numbers correspond to those in ACI 301. Note that each technical section of ACI 301 includes General requirements, Products, and Execution per the Three-Part Section Format of the Construction Specification Institute.

Section 1 (ACI 301) - General Requirements

- 1.5.3.1 The Contractor shall submit a quality control plan that addresses the following.
 - (a) Control and maintenance of project documents.
 - (b) Subcontractor/supplier services and verification of purchased products and materials.
 - (c) Concrete production inspection and testing.
 - (d) Pre-placement inspection including formwork, reinforcing and embedments.

- (e) Placement inspection including consolidation, finishing and initial curing of concrete.
 - (f) Post-placement inspection including monitoring of moist curing and curing temperatures, verification of in-place strength before removal of shoring, and protection of exposed surfaces.
- 1.6.2.2(c) The Contractor is required to arrange for all testing, giving the Owner's testing agency at least 24 hours advance notice.
- 1.6.2.2(d)1 The Contractor shall provide curing boxes as required by ASTM C31. Coordinate quantity and location with the Construction Manager and Testing Agency.
- 1.6.3.1(c) The Owner's testing agency shall report in writing all test results to Architect/Engineer, Contractor, Construction Manager and concrete supplier within three (3) working days after the tests are performed. Report by phone or email the results of early break cylinders to Contractor and Construction Manager. Reports of strength tests shall contain the name of the project, date and time of placement, location of placement, placement method, water added at site, sample location, weather conditions, batch ticket number, batch size, mix identification, specified strength, breaking strength and type of break, specimen diameter and weight, types of admixtures, percentage of entrained air, slump, concrete temperature, and detailed information of storage and curing of specimens before testing.
- 1.6.3.2(d)1 Unless noted otherwise concrete shall have at least one strength test for each 150 cubic yards, or fraction thereof, placed in any one day, nor less than one test for each 5000 square feet of surface area of slabs or walls, or fraction thereof. Strength tests are not required for backfill concrete.
- 1.6.3.2(d)2 Determine the slump (ASTM C143) for each batch of concrete that high-range water-reducer (superplasticizer) is added to in the field. Test and report slump both before and after superplasticizer is added.
- 1.6.3.2(e)1 When 6 by 12 in. cylinders are used make four test specimens for each sample (five required for mixes requiring 56 day strength tests). When 4 by 8 in. cylinders are used make five test specimens for each sample (six required for mixes requiring 56 day strength tests). One specimen shall be a hold specimen, to be tested only if a defective specimen is found.
- 1.6.3.2(e)2 Age of concrete for acceptance shall be 28 days unless otherwise shown in TABLE 4.2.2.8.b. Concrete mixes with strength specified at 56 days shall have one cylinder tested at 7 days, one at 28 days, and two 6 by 12 in. cylinders or three 4 by 8 in. cylinders at 56 days.

- 1.6.3.2(f) Air content tests shall be conducted on the first three batches in each placement of all mixes in which air entrainment is specified and until three consecutive batches have air contents within the range specified, at which time every third batch shall be tested. This test frequency shall be maintained until a batch is not within the range specified, at which time testing of each batch will be resumed until three consecutive batches have air contents within the specified range.
1. For pumped concrete the second or third batch in the placement, and periodically throughout the placement but not less than once for each 100 cubic yards, shall have air content checked at both the end of the truck discharge and at the end of the hose.
 2. Concrete that does not satisfy air entrainment requirements shall be rejected.
- 1.6.3.2(g) Testing services provide the basis for acceptance or rejection of concrete furnished by this contract. Therefore, it is necessary that testing for air content and slump not only be done after all adjustments have been made, but before the concrete is discharged.
- 1.6.3.3(f) The Owner will employ an inspection agency to visually inspect the placement of reinforcing steel. Reference OBC 1704.4. Do not place concrete until all outstanding issues cited in the inspection reports have been corrected. Inspection of reinforcing steel to include, but not limited to:
1. Size, spacing, and quantity of bars.
 2. Bar splices.
 3. Embedments.
 4. Concrete cover.
 5. Support and securement.
 6. Coatings.
 7. Spacing and drape of post-tensioning strands.
 8. Encapsulation system of post-tensioning strands.
- 1.6.3.3(g) The Owner will employ an inspection agency to inspect concrete operations including, but not limited to:
1. Use of proper concrete mix.
 2. Consolidation.
 3. Finish and finishing operations.
 4. Curing methods, materials, and procedures.
 5. Shoring removal and reshoring operations.
 6. Formwork materials.
- 1.6.4.1(a) Contractor shall be responsible for costs of tests on hardened concrete performed by Owner's testing agency if the tests are required to verify the strength or air content of the concrete because representative concrete cylinder tests or air content tests failed to meet acceptance criteria.

Owner will be responsible for costs of tests on hardened concrete performed by Owner's testing agency if the tests are at the Owner's request and representative concrete cylinder and air content tests meet acceptance criteria.

- 1.6.8.4 Concrete which fails to meet the requirements of this Specification shall be rejected.
- 1.7.1.6 The Contractor shall bear all costs of correcting rejected work, including the cost of the Architect's and Engineer's additional services thereby made necessary.
- 1.8.4 Masonry shall not be placed on or supported off of structural floors until the concrete is at least 28 days old and all shoring has been removed.

Section 2 (ACI 301) - Formwork and Formwork Accessories

- 2.1.2.1(g) Form tie configuration and spacing for all exposed-to-view concrete shall be submitted for review and approval of the Architect. Form tie configuration shall be 24" x 24" unless noted otherwise
- 2.2.1.3 Form release agent shall be a commercial formulation form coating compound that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. The form release agent manufacturer shall certify that the form release agent is chemically and physically compatible with all subsequent treatments of concrete surfaces. Furthermore, the form release agent shall be approved in writing by the manufacturers of all subsequent treatments.
- 2.2.1.4 Preformed Expansion Joint Filler: Non-impregnated type, closed cell resilient polyethylene foam, 1/2 in. thick unless otherwise noted on the Drawings.
- 2.2.1.5(a) Waterstops:
 - 1. Bentonite rope joint sealant (1¼" x ½" minimum) shall be installed in all vertical and horizontal **construction joints** in concrete walls below and exposed to grade, including slab/wall construction joints, unless otherwise noted. Secure with manufacturer's adhesive and mechanical fasteners as required for a secure installation. Construction joint shall be clean and dry. Prior approved products: Volclay Waterstop-RX 101T, HYPER STOP DB-2515, QUELLMAX 18x24.
- 2.2.1.5(b) Embedded items shall not be made of aluminum.
- 2.2.2.1 Design and engineering of formwork shall be the responsibility of the Contractor. Design of formwork and preparation of formwork drawings shall be under the supervision of a licensed design engineer registered in

the state where the Project is located. Formwork drawings shall be sealed by the licensed design engineer responsible for the design of the formwork.

- 2.2.2.3 Footings, pile caps, and grade beams shall be poured neat unless approved in writing by the Owner's Geotechnical Engineer and Structural Engineer prior to placement of concrete.
- 2.2.2.5(e) Construction joints shall be located such that the maximum placement length of a continuous concrete wall will not exceed 100 feet in any one day.
- 2.2.3.2 Form ties for exposed-to-view concrete walls shall leave a 1-1/4 in. diameter cone hole. This hole will be left open or epoxy mortared at the discretion of the Architect. See cone hole detail on Drawings for depth of mortar fill.

The ties shall be one of the following:

- (a) Stainless steel "snap-ties" with a 1 in. break back.
- (b) Galvanized "coil-bolt" type tie.
- (c) "She-bolt" tie with the inner male unit galvanized.
- (d) Other removable type tie with approval of the Architect.

- 2.3.1.2(a) Exposed edges of columns, walls, slabs and beams shall have 3/4 in. bevels, unless otherwise noted.
- 2.3.1.5(a) Concrete construction tolerances, even portions above 100 feet in elevation, shall be in accordance with ACI 117 with the following exceptions:
 - 1. Variation in concrete edges supporting masonry and surfaces behind masonry and glass curtain wall shall not exceed plus or minus 1/2 in. from theoretical plan dimension.
 - 2. Variation of beam soffit supporting masonry shall not exceed plus or minus 1/2 in. from theoretical elevation.
 - 3. The class of surface for offset between adjacent pieces of formwork facing material shall be Class A for all surfaces exposed to view, and class C for all surfaces not exposed to view when the project is complete. Refer to 5.3.3.7 for ribbed slabs formed with metal pans.
 - 4. Tolerances for placing anchor bolts and other embedded items for structural steel work (Section 05 12 00) shall be in accordance with the AISC Code of Standard Practice for Steel Buildings and Bridges.
- 2.3.1.5(b) A preconstruction meeting shall be arranged by the Contractor for the purpose of reviewing critical tolerances, methods of making measurements, and the basis for acceptance or rejection of completed work to avoid misunderstandings at the time of final acceptance.

- 2.3.1.6(a) If required, retighten forms and bracing after concrete placement, but before concrete has taken its initial set, to eliminate mortar leaks and maintain proper alignment.
- 2.3.1.12(a) All sleeves, inserts and embedded items required by plumbing scope of work shall be furnished and placed by the plumbing subcontractor. All other sleeves, inserts, reglets, dovetail anchor slots, anchors and embedded items shall be furnished and placed by the Contractor performing the work of this Section and as directed by Construction Manager.
- 2.3.1.12(b) Sleeves, inserts, anchors and embedded items not shown on structural drawings must be approved by Architect/Engineer, as a Contractor prepared shop drawing and coordination drawing submittal. Submit drawing at least 14 days before placement of concrete.
- 2.3.1.14(a) Remove chips, wood, sawdust, dirt and debris just before concrete is placed.
- 2.3.1.18 Provisions for Other Trades: Provide openings in concrete and concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms. Size and location of openings, recesses and chases not shown on structural drawings must be approved by Architect/Engineer, as a Contractor-prepared shop drawing and coordination drawing submittal, before placement of concrete.
- 2.3.2.4(a) Forms may be removed when the in-place concrete reaches the specified 28-day compression strength, or when the concrete reaches 75% of the specified 28-day compression strength and is no less than 7 days old. The 7-day minimum age requirement may be waived pending review of the proposed mix designs, forming systems, reshoring procedures and in-place concrete strengths.
- 2.3.3.4(a) Reshoring is required for multistory construction. The Architect/Engineer has the prerogative of disallowing any specific procedures that he may consider to be deleterious to the performance of the structure in its completed form.
- 2.3.3.4(b) The attention of the Contractor is directed to the following:
 - 1. Live load and superimposed dead load capacities of each level are noted on the Drawings. Live loads are typically reduced per the building code for the design of beams and girders.
 - 2. In general, the weight of newly placed concrete for a level, plus adequate construction load allowance, will exceed the combined live and superimposed dead load capacity of the level below.

3. When shores or reshores must extend to the ground to provide the required load-carrying capacity, the floors above the ground shall not be considered to be contributory to the shoring and reshoring capacity.
- 2.3.4.2(b)1 When Windsor Probe tests are used to evaluate the in-place strength of the concrete for form removal, the tests shall be performed by an approved testing agency in accordance with ASTM C803, with at least one test for each 1800 square feet of elevated structure. Windsor Probe tests shall be correlated to laboratory cured cylinders or drilled cores of the same material and mix-design to be tested.
- 2.3.4.3 Forms may not be removed until the actual in-place strength of the concrete is demonstrated by field-cured test cylinders, Windsor Probes, pullout tests, or the maturity method (ASTM C1074), regardless of the results of tests on laboratory-cured cylinders. These additional test cylinders or other tests must be arranged and paid for by the Contractor.

Section 3 (ACI 301) - Reinforcement and Reinforcement Supports

- 3.1.3.1(a) Protect reinforcement surfaces from contact with soil, oil, formwork release agent, or other materials that decrease bond to concrete.
- 3.2.1.1(a) All reinforcing steel shall have a minimum F_y of 60 ksi. In addition, all reinforcing steel to be welded shall meet ASTM A706 and have a maximum carbon equivalent of 0.45%.
- 3.2.1.2(b)1 All reinforcement in structured stairs and landings, all columns, and other locations noted on the Drawings, shall be epoxy coated.
- 3.2.1.2(b)2 Epoxy coating shall be applied in plants certified in accordance with the CRSI Epoxy Coating Plant Certification Program.
- 3.2.1.2(b)3 Since the epoxy coating is flammable, the coated bars shall not be exposed to any fire or flame. Cutting coated bars by burning will not be permitted.
- 3.2.1.2(b)4 Repairs of coatings on epoxy coated bars and coated accessories shall be made at all breaks, abrasions, etc. exceeding an area of 0.01 sq. in., and at cut ends.
- 3.2.1.2(b)5 Every reasonable effort shall be made to repair all damaged areas of epoxy-coated reinforcing steel and accessories before any rusting occurs. If infrequent and small damaged areas do rust, the rust shall be thoroughly removed by media blasting or other approved method before the areas are repaired. The Contractor shall exercise care to ensure that coated bars, when incorporated into the work, are free from dirt, paint, oil, grease, or other foreign substances. The Architect/Engineer reserves the right to require cleaning of the reinforcement without additional compensation due the Contractor. It

is the intent of this specification that an entirely rust-free and completely coated steel reinforcement system be provided before the concrete is placed. Placing of concrete shall be performed with methods and equipment that will not damage the coated materials.

- 3.2.1.7(a)1 Welded wire reinforcement shall be in accordance with ASTM A1064 (smooth wire) unless noted otherwise on the Drawings. Furnish in flat sheets.
- 3.2.1.9(a) All clips, chairs, bars, and bar supports and other metallic materials used for installation or support of epoxy-coated reinforcing shall be entirely coated with epoxy or another polymer approved by the epoxy coating manufacturer.
- 3.2.1.9(b) Bar supports touching forms in concrete exposed to view, exterior or interior, shall be stainless steel, except use plastic or epoxy coated bar supports where bars are epoxy coated. Provide bar spacers for reinforcement in all walls.
- 3.2.1.10(a) Mechanical and welded splices of reinforcing steel shall be in accordance with ACI 318 and ACI 439.3R and approved by the Architect/Engineer.
- 3.2.1.11 Tie wire for holding reinforcing steel in position for Architectural Concrete shall be stainless steel except where bars are epoxy coated. Tie wire for all epoxy-coated bars shall be mylar or plastic-coated. Typically, ends of tie wire must have a minimum of 1 in. clear distance to face of concrete.
- 3.2.2.2(a)1 Welding of reinforcing steel and welded wire reinforcement is not permitted without the approval of the Architect/Engineer.
- 3.3.2.8(e) Bending of reinforcing steel partially embedded in concrete is not permitted, unless otherwise detailed on the Contract Documents.
- 3.3.2.11 Placement of bars shall also be in accordance with the detailed recommendations given in the Concrete Reinforcing Steel Institute's "Placing Reinforcing Bars", 9th Edition.
- 3.3.2.12 Provide material and placement of contingency reinforcement as noted on the drawings. Bars are to be cut, bent and placed as directed by the Architect/Engineer as extra reinforcement without additional cost.

Section 4 (ACI 301) - Concrete Mixtures

- 4.1.1.1 The ready-mix concrete producer is completely and solely responsible for the design, production, and delivery of the concrete mixes to satisfy this Specification. The Contractor shall coordinate the review of the mix designs between the Ready-Mix Producer, Forming Contractor, and Placing/Finishing Contractor. The Contractor is responsible for informing the Ready-Mix Producer of the conditions at the job site, such as methods being used for placing concrete. Adjustments required to facilitate placing

and achieve the desired results shall fall within the criteria of this Specification and shall be at no additional cost to the Owner. All mix designs and proposed adjustments to the same shall be submitted to the Architect/Engineer for review.

- 4.2.1.1(a)1 Cement for all concrete shall be ASTM C150, Type I or Type II unless otherwise noted. Air-entrained cement shall not be used. Air requirements shall be met by use of separate admixtures.
- 4.2.1.1(d)1 Class C and Class F fly ashes shall comply with ASTM C618, except that in addition to the requirements of ASTM C618, Type F fly ash shall have a maximum Loss on Ignition of 3%, with a maximum variation of 1%. Contractor's mix design submittal for mixes which include fly ash must be accompanied by complete chemical and physical analyses and quality control records for the proposed fly ash source for at least two years immediately prior to the proposed use on this project.
- 4.2.1.1(d)2 When fly ash is used, the ratio of fly ash to total cementitious materials shall be not less than 15% and no greater than 25%.
- 4.2.1.1(e)1 Ground granulated blast-furnace slag shall be Grade 100 or Grade 120 per ASTM C989.
- 4.2.1.1(e)2 When ground granulated blast-furnace slag is used, the maximum amount shall be limited to 40% by weight of the total cementitious materials.
- 4.2.1.2(a) All normal weight aggregates shall be graded, a mix of fine, intermediate, and coarse aggregates, and shall also conform to Ohio Department of Transportation (ODOT) 703.02 as required for superstructures.
 - 1. Aggregate certification submittal shall include copies of test reports on the fine, intermediate, and coarse aggregates proposed to be used, made by a testing laboratory acceptable to the Architect/Engineer, showing source of the materials and conformance with specification requirements. Date of test shall not be more than six months prior to date of submittal. Contractor shall furnish similar copies, of current date, when there is a change in source of material and at any time upon demand by the Architect/Engineer.
- 4.2.1.3(a) Concrete mixer washout water shall not be used in any concrete except Backfill Concrete.
- 4.2.1.4.2(a) Calcium chloride, or admixtures containing more than .05% calcium chloride ions are not permitted. Written conformance to this requirement and the chloride content is required from the admixture manufacturer prior to mix design review.

- 4.2.1.4.3 High-range water-reducing admixture (superplasticizer) conforming to ASTM C494, Type F or G shall be used in all concrete with a specified maximum water-cementitious materials ratio below 0.42. The admixture may also be used at Contractor's option in other mixes, with the written approval of the Architect/Engineer, at no additional cost to the owner.
- 4.2.1.4.4 Water-reducing, non-chloride, non-corrosive, accelerating admixture conforming to ASTM C494, Type C or E, shall be used when early initial set is required. The admixture must have non-corrosive test data of a year's duration from an independent testing laboratory using an acceptable, accelerated corrosion test method such as that using electrical potential measures.
- 4.2.1.4.5 Water-reducing, retarding admixture conforming to ASTM C494, Type D shall be used when delay of the setting time for concrete is required.
- 4.2.1.4.6 Extended set-control admixtures, if used shall be added to the concrete during or immediately after the batching process. The dosage rate for each Mix Type shall be pre-determined by trial mixtures in which the admixture is added to a minimum 8 cu. yd. batch.
- 4.2.1.4.7 All admixtures shall be approved by the cement manufacturer.
- 4.2.1.4.8 Corrosion Inhibitor Admixture: Contractor has option of using one of the following. Refer to Table 4.2.2.8(b) for dosage.
 - (a) Calcium Nitrite ($\text{Ca}(\text{NO}_2)_2$); 30% (+/-2%) by weight of solution complying with ASTM C494, Type C. Acceptable manufacturers are W.R. Grace and BASF Corporation. Other manufacturers shall submit qualifications and test results for review and approval by Architect/Engineer.
 - (b) Migrating Corrosion Inhibitor; Pre-approved product is MCI-2005 NS manufactured by Cortec Corporation. Other manufacturers shall submit qualifications and test results for review and approval by Architect/Engineer.
- 4.2.1.6(a) Materials used for exposed concrete shall be furnished from the same source throughout the project unless otherwise approved by the Architect/Engineer.
- 4.2.2.2(a) Concrete, except Mix Type C, shall be produced to have a maximum slump at the point of placement of 4 inches with a tolerance of one inch. This maximum slump may not be exceeded except by the job site addition of high-range water-reducer (superplasticizer). In those portions of the structure where member dimensions or congestion due to reinforcing steel prevent the proper placement and consolidation of the concrete at the maximum slump specified, superplasticizer shall be used by the Contractor in lieu of increasing the slump of non-superplasticized

concrete by the addition of water. Approved mix designs, with smaller size aggregates, may also be used in congested areas to facilitate concrete placement.

1. When superplasticizer is used, the maximum pre-adjusted slump shall be 4", and the maximum superplasticized slump shall be 8".
2. Mix Type C: Refer to paragraph 4.2.3.7.

- 4.2.2.4(c)1 For pumped concrete, air content shall be periodically tested at both the truck discharge and end of hose. The required air content for acceptance at the truck discharge shall be adjusted, if necessary, to account for loss of air content during pumping.
- 4.2.2.4(d)1 Tolerance on air content for slabs that receive a trowel finish shall be +0.5%, -1.5%.
- 4.2.2.5(b) Maximum concrete temperature at time of discharge shall not exceed 95 °F. If necessary, use nitrogen cooling to maintain concrete temperature.
- 4.2.2.7(d)1 Chloride ion concentration - Maximum water-soluble chloride ion concentrations in hardened concrete at an age of 28 to 42 days contributed from all ingredients, including water, aggregates, cementitious materials and admixtures shall not exceed the limits indicated in Table 4.2.2.8(b). Immediately after receipt of contract, Contractor shall test proposed individual concrete ingredients for total chloride ion content. If the total chloride ion content calculated on the basis of the proposed concrete mix proportions exceeds the specified limits, it will be necessary to test hardened concrete samples of the proposed mix for water-soluble chloride ion content. If these test results exceed the specified limits, it will be necessary to vary ingredients and material sources and retest until specified limits are met.
- a. Testing shall be performed by an independent testing laboratory employed and paid by the Contractor following ASTM C1218 test procedures.
- 4.2.2.8(b) Strength - Minimum concrete strengths shall be in accordance with Table 4.2.2.8(b). Note that some mixes may be specified with compressive strength requirements at other than 28 days.

Table 4.2.2.8(b) - Mixes and Locations

MIX TYPE	LOCATION	SPECIFIED STRENGTH (psi at days) (1)	MIN. PORTLAND CEMENT (lb. / cu. yd.) (2)	MAX % OF CHLORIDE BY WEIGHT OF CEMENT	MAX W/CM RATIO	AIR % (1,3)	AGG. SIZE (4)
A	Foundations: Footings, pile caps, grade beams	4500 at 28	565	0.30	0.50	-	No. 57, 1 in.
B	Slab on grade, walls, rails, exterior topping slabs, and other exterior exposure	5000 at 28	600 (5)	0.15	0.40	6 +/- 1.5	No. 57, 1 in.
C	Columns and Shear Walls	5000 at 28	658 (5)(6)	0.06	0.40	6 +/- 1.5	No. 57, 1 in.
D	Backfill concrete	1500 at 28	280	1.0	-	-	No. 57, 1 in.

NOTES:

- Concrete which is placed and does not meet strength or air content requirements shall be removed and replaced at no cost to the Owner.
- Including fly ash or ground granulated blast-furnace (GGBF) slag in mixes where permitted. Not applicable if a specified minimum amount of fly ash or GGBF slag is listed with the mix. The minimum cement requirement may be met by substituting 1.33 lb. of fly ash for each 1.0 lb. of portland cement replaced, or 1.0 lb. of GGBF slag for each 1.0 lb. of portland cement replaced. The ratio of fly ash to total cementitious materials shall be no less than 15% and no greater than 25%; the ratio of GGBF slag to total cementitious materials shall be no greater than 40%; and the total of fly ash and GGBF slag shall be no greater than 50% of total cementitious materials.
- Tolerance on entrained air content shall be as delivered.
- Normal weight aggregate.
- Fly ash not permitted in this mix.
- Provide corrosion inhibitor in this mix per 4.2.1.4.8. Dosage to be 3 gallons per cu. yd. of Calcium Nitrite solution or 1-1/2 pints per cu. yd. of Migrating Corrosion Inhibitor.
- The maximum ratio of GGBF slag to total cementitious materials in Mix Type B shall be limited to 25%.

4.2.3.5(a) Mix designs incorporating superplasticizer must be accompanied by test results from cylinders made from trial batches or field test data in which the superplasticizer was added to a minimum 8 cu. yd. batch in a truck mixer.

4.2.3.7 The following requirements apply only to Mix Type C concrete.

- At Contractor's option, cement and water quantities may be increased to aid in placement and finishing provided the specified ratios are maintained. In calculating the water/cement ratio, water is

all water from all sources including admixtures and that contained in the aggregate above the saturated surface dry condition.

2. Produce concrete to have a maximum slump at delivery to the site of 2½" to 5". To aid workability and consolidation, High Range Water Reducers (Superplasticizers) shall be added to the mix at the site to increase slump of concrete to 7" ± 1". No water shall be added to the mix at the site.
3. Mix design, including superplasticizers, shall be proportioned by ACI 301 Section 4.
4. Designate all types of admixtures to be used in Mix Type C, including superplasticizers.

4.3.1.1(a) Site produced concrete is prohibited.

4.3.1.4 When a high-range water-reducer (superplasticizer) is added at the site it shall be premeasured and added in accordance with the manufacturer's written instructions and specifications, using truck-mounted power injection equipment capable of rapidly and uniformly distributing the admixture to the concrete. The concrete shall be mixed for a minimum of six minutes after addition of the superplasticizer prior to discharge.

4.3.2.1(a) Slump adjustment: When concrete arrives at the project with slump below that suitable for placing, and below the slump specified, water may be added only if neither the maximum water-cementitious materials ratio nor the maximum slump is exceeded, provided that:

1. The approved mix design has allowed for the addition of water on site.
2. The amount of water added at the site is accurately measured to plus or minus 1 gallon of the desired added amount.
3. The water addition is followed by 3 minutes of mixing at mixing speed prior to discharge.
4. Standard cylinder samples as required by these Specifications are taken after addition of water.
5. The person authorized to add water shall be mutually approved by Architect/Engineer, Contractor, Construction Manager and Ready-Mix Producer.

4.3.2.1(b) Do not add water to concrete after high-range water-reducing admixtures have been added.

4.3.2.1(c) The maximum water-cementitious materials ratio is defined as that of the mix design furnished by the ready-mix producer. (Not to exceed values noted in Table 4.2.2.8(b)).

4.3.2.1(d) Concrete arriving at the site above the maximum slump shall be rejected.

4.3.2.1(e) Addition of cement, except as part of initial batching at the plant in accordance with an approved mix design, is prohibited.

- 4.3.2.2(a) The concrete must be discharged from the ready-mix trucks within 1-1/2 hours after the introduction of mixing water to the cement and aggregates.
1. During hot weather or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required. When air temperature is between 85 °F (30 °C) and 90 °F (32 °C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 °F (32 °C) reduce mixing and delivery time to 60 minutes.
- 4.3.2.3 Furnish to the Project Superintendent 2 delivery tickets with each load of concrete. Tickets shall contain the following information.
- (a) Date.
 - (b) Producer and plant.
 - (c) Job.
 - (d) Contractor.
 - (e) Truck No. and time dispatched.
 - (f) Concrete designation and cement type.
 - (g) Admixtures description and content.
 - (h) Time discharge started and completed.
 - (i) Amount of concrete in load.
 - (j) Amount of water in mix at plant.
 - (k) Amount of any material added at the site and authorized signature.

Section 5 (ACI 301) - Handling, Placing and Constructing

- 5.1.2.1(d)1 Notify the Architect/Engineer at least two working days prior to placing concrete.
- 5.1.2.1(d)2 No concrete shall be placed without Owner's Testing Agency being present. Give due notice to the Architect/Engineer and all Contractors affected before placing concrete. Allow adequate time for installation of all necessary parts.
- 5.2.1.1(a) Water used for curing exposed surfaces shall be free of substances that will stain or discolor concrete.
- 5.2.1.2 Curing Compounds:
- (a) Curing Compound for unformed surfaces that will not receive a coating or bonded floor covering shall conform to the requirements of ASTM C1315, Type I, Class A.
 - (b) Curing Compound for formed surfaces, and unformed surfaces that will receive a coating or bonded floor covering, shall be a dissipating or removable curing compound that conforms to ASTM C309. Furthermore, the curing compound shall be approved in writing by

the manufacturers of all coatings, floor coverings and surface treatments used on the project. Confirm types and locations of coatings, flooring, and surface treatments with Architect.

- (c) Curing compound for exposed vertical work (columns and walls) shall be clear, non-residual, water-based, and VOC compliant. Prior accepted products are:
 - 1. L&M 'Cure'.
 - 2. Or approved equal.
- (d) Curing compound(s) shall comply with all applicable environmental and clean air regulations for the community in which this Project is located.
- (e) Curing compound for the elevated parking deck (Mix Type B) and parking area slabs-on-grade shall meet ASTM C1315, Type 1 and AASHTO M148 and contain a fugitive dye. Prior accepted products are:
 - 1. Euclid Chemical Company 'Super Rez-Seal'.
 - 2. Euclid Chemical Company 'Super Aqua-Cure VOX'.
 - 3. L&M 'Dress & Seal 30'.
 - 4. L&M 'Dress & Seal WB 30'.
 - 5. Master Builders MasterKure CC 300 SB
 - 6. Master Builders MasterKure CC 1315WB

5.2.1.3 Waterproof curing sheets shall comply with ASTM C171. Prior approved materials:

- (a) Orange Label Sisalkraft paper manufactured by the Fortifiber Building Systems Group.
- (b) Polyethylene film, minimum 8 mils thickness. Except do not use on surfaces that will be left exposed to view when the project is complete.
- (c) BurLene curing blankets manufactured by the Max Katz Bag Company, Inc.

5.2.1.7(a) Epoxy bonding agent shall comply with ASTM C881, Type V, Grade 2, with Class corresponding to temperature at time of pour.

5.2.1.7(b) Latex bonding agent shall comply with ASTM C1059, Type II.

5.2.1.10 Related materials for concrete construction shall be as follows:

5.2.1.10(a) Non-slip Aggregate used as the abrasive aggregate for a non-slip floor finish shall be fused aluminum oxide grits, or crushed emery. Emery aggregate shall contain not less than 40% aluminum oxide nor less than 24% ferric oxide. Use material that is factory-graded, packaged, rustproof

and non-glazing, and is unaffected by freezing, moisture and cleaning materials.

- 5.2.1.10(b) Non-shrink grout shall have a minimum compression strength of 7000 psi at 28 days and be a non-shrink, non-metallic, non-staining, non-corrosive, premixed grout. Comply with ASTM C1107.

Prior approved grouts:

1. Dayton Superior Sure-Grip High Performance Grout
2. Euclid Hi Flow or NS Grout
3. Master Builders MasterFlow 713 or MasterFlow 928 grout

- 5.2.1.10(c) Neoprene bearing pads shown on drawings shall be 100% virgin chloroprene (Neoprene) and shall meet AASHTO specifications. Shore "A" hardness shall be 60 unless otherwise noted. Submit certification and test reports for the actual production run of these pads as part of the shop drawing submittal procedure.

- 5.2.1.10(d) Construction and Control Joint Sealant:

Performance and physical properties shall be comparable to the following pre-approved products.

1. Epolith-P or Epolith-G epoxy joint fillers by BASF Constuction Chemicals, LLC.
2. EUCO 700 or 800 by The Euclid Chemical Company.
3. MM-80 by Metzger/McGuire Company.

- 5.2.1.10(e) Epoxy Adhesive:

1. Two-component, high modulus, high strength, structural epoxy adhesive for use in installing reinforcing steel dowels into hardened concrete.
2. ASTM C 881, Type IV, Grade 3 with class corresponding to temperature at time of placement.

- 5.3.1.3(d) Verify position and securement of embedded items before placing concrete.

- 5.3.1.4(a)1 Following approval of prepared subgrades by Geotechnical Engineer, spread and compact granular base course to 100% maximum dry density as determined by standard Proctor Method ASTM D698.

- 5.3.1.4(c) Do not place vapor retarder under garage slabs-on-grade.

- 5.3.1.5(a) Make provisions in advance for wind-breaks, shading, fogging, sprinkling, ponding, or wet curing as dictated by conditions at time of concrete placement.

- 5.3.1.7 Discharge of concrete from ready-mix trucks shall not begin until testing agency has made preliminary checks of slump (and air content - if required).

- 5.3.2.1(a)1 Adequate protection against rain, sleet or snow shall be defined as protection that prevents any and all adverse affects of the rain, sleet or snow on the appearance, strength or durability of the concrete.
- 5.3.2.1(b)1 Placement of concrete in cold weather shall also comply with Article 1.9 of this specification, titled Cold Weather Concreting.
- 5.3.2.1(c)1 Placement of concrete in hot weather shall also comply with Article 1.10 of this specification, titled Hot Weather Concreting.
- 5.3.2.1(d) Evaporation Retarder - When low humidity and/or dry winds create conditions suitable for plastic cracking, evaporation retarder may be required to be applied by spray one or more times during the finishing operation. Evaporation retarder shall not be used as a finishing aid.
- 5.3.2.3(c)1 Pumping pipes and hoses shall be supported above in-place reinforcing on plywood or tires to cushion impacts, prevent abrasions of epoxy coatings and prevent displacement of reinforcement.
- 5.3.2.4(i) Assume 1/2 in. average extra concrete will be required to account for deflection of metal deck.
- 5.3.2.4(j) Concrete is not permitted to be placed in standing water or under water without approval of Architect/Engineer.
- 5.3.2.6(d) Bond is required for vertical construction joints in horizontal members, except for slabs on grade.
- 5.3.3.3(a) *Surface finish-1.0 (SF-1.0):*
 - 1. No formwork facing material is specified.
 - 2. Patch voids larger than 1-1/2 in. wide or 1/2 in. deep.
 - 3. Remove projections larger than 1/2 in.
 - 4. Tie holes need not be patched.
 - 5. Surface tolerance Class C as specified in ACI 117.
 - 6. Mockup not required.
- 5.3.3.3(b) *Surface finish-2.0 (SF-2.0):*
 - 1. Patch voids larger than 3/4 in. wide or 1/2 in. deep.
 - 2. Remove projections larger than 1/8 in.
 - 3. Patch tie holes unless indicated otherwise in Contract Documents.
 - 4. Surface tolerance Class A as specified in ACI 117.
 - 5. Mockup not required.
- 5.3.3.3(c) *Surface finish-3.0 (SF-3.0):*
 - 1. Patch voids larger than 3/4 in. wide or 1/2 in. deep.
 - 2. Remove projections larger than 1/8 in.
 - 3. Patch tie holes unless indicated otherwise in Contract Documents.
 - 4. Surface tolerance Class A as specified in ACI 117.
 - 5. Provide mockup of concrete surface appearance and texture.

5.3.3.4(b)1 Where a grout-cleaned rubbed finish is indicated, grout color shall match color of concrete surface to which the grout is applied. When the color of the grout lightens due to drying, rub the surface and keep the surface damp for 36 hours afterward.

5.3.3.4(c)1 Where a cork-floated finish is specified, grout color shall match color of concrete surface to which the grout is applied.

5.3.3.7 Specified Finishes of Formed Surfaces:

(a) NON-EXPOSED SURFACES shall be SF-1.0 per 5.3.3.3(a). This includes all non-exposed flat surface and ribbed slabs. Metal pans shall be new or factory reconditioned, with stiffeners to support concrete without sags and bulges in order to satisfy a Class D surface tolerance per ACI 117.

(b) EXPOSED SURFACES:

1. SMOOTH FORM FINISH: all exposed-to-view formed surfaces in the parking garage shall be Surface Finish 2.0 (SF-2.0) per 5.3.3.3.b. Vertical surfaces to be cast against Class 1 High Density Overlaid Plyform (HDO – Concrete Form) true to line. Slab and beam soffits to be cast against Class 1 HDO Plyform or Class 1 Medium Density Overlaid Plyform (MDO – Concrete Form). **The vertical walls in the garage (shearwalls, elevator walls, etc) shall include the following supplemental requirements also:**

a. Form material and layout must be approved by Architect prior to placing concrete. Note that modular handset-type forms (such as Symons Steel-Ply, etc.), which create ridges at form/panel edges, are not acceptable and shall not be used.

b. Formwork for exposed surfaces shall be in 8-foot lengths, 4-foot widths; orient vertically, unless noted otherwise. Apply impermeable coating to wood rustications or chamfers. Seal form joints and around all ties, reveals, etc. by taping or with non-absorbent caulking (ASTM C 920, Type a, Grade NS, or C 834). Clean taper ties and she-bolts and lubricate with a nonstaining grease or form release agent before each use. Keep form face clean until concrete is placed. Clean forms after each use and discard damaged forms. Refer to paragraph 2.3.1.5.a.3 for form panel offset tolerance requirements.

c. Form ties for exposed-to-view concrete walls shall leave a 1-1/4" diameter cone hole. This hole will be partially filled (refer to typical detail), unless otherwise noted. As shown

on the Drawings, the tie pattern shall be a regular 24" x 24" pattern (unless noted otherwise) and generally at consistent elevations throughout the project, and is subject to the Architect's review and approval. The ties shall be one of the following:

1. Stainless steel "snap-ties" with a 1" to 1-1/2" breakback.
 2. Galvanized "coil-bolt" type tie.
 3. "She-bolt" tie with the inner male unit galvanized.
 4. Other removable type tie with approval of the Architect.
- d. During placement, take precautions to minimize mortar splatter on form faces. Deposit concrete in the final position without segregation or loss of material. Do not move concrete horizontally. Place concrete in uniform horizontal layers not more than 36" high for consolidation. Place concrete continuously without exceeding rate of placement used in design of forms. Vibrate placed concrete for maximum consolidation of concrete. Overlap the zones of influence a minimum of 50 percent. Withdraw internal vibrator at a rate of 3 inches per second. Keep internal vibrators 2 inches from form face.
- e. Contractor shall strip forms for exposed-surface concrete at the same age of concrete throughout the project for uniform, consistent color and finish. Refer to 6.1.1.1.a also.
- f. **NO PORTIONS OF EXPOSED TO VIEW SURFACES SHALL BE GROUND WITH MECHANICAL GRINDERS.**
- g. Repairs – refer to 6.1.1.1.a. Where repairs are required, all voids, damaged areas, fins, projections, and honeycomb areas, shall be removed down to sound concrete and shall be repaired immediately after form removal. All patching and repairs shall have prior approval of the Architect as to method and procedure. Any concrete which has not been formed as shown on the Contract Drawings or indicates a defective or unsound surface, and which can't be repaired acceptably, shall be removed and replaced. Permission to patch or attempt a correction shall not be construed to be a waiver of the Owner's right to require complete removal of the defective work should the patching or correction prove to be, in the opinion of the Owner and Architect, unsatisfactory either as to structure or appearance.

5.3.3.8 In the case of disagreement regarding use of damaged or worn formwork impairing the concrete surface the Architect's decision shall be final.

- 5.3.4.2.1 Slabs shall be finished in accordance with 5.3.4.2(i) 'Unspecified unformed surface finishes' (as described in ACI 301), unless indicated otherwise on the architectural drawings or in 5.3.4.2(j).
- 5.3.4.2(c)1 Do not apply a 'hard-troweled' finish to air-entrained concrete specified to receive a 'trowel' finish.
- 5.3.4.2(c)2 Rider-operated floats and trowels shall not be used on air-entrained concrete specified to receive a trowel finish.
- 5.3.4.2(j) Specified Finishes of Unformed Surfaces:
- Type A Exterior and garage areas exposed to vehicular or pedestrian traffic to receive a floated or light broom finish per the Architect's direction. Finish slabs to a manual straightedge 'conventional' tolerance per ACI 117 (1/2 in. in 10 feet) and provide positive drainage with no "ponds" greater than 6 in. in diameter. Do not "over finish" slabs.
- Type B Building interior slabs-on-grade and supported decks and all other slabs not specifically indicated shall receive a steel trowel finish in accordance with 5.3.4.2(c). Finish slabs to a 'flat' tolerance ($SOF_F=35$, $MLF_F=28$, $SOF_L=25$, $MLF_L=20$) in accordance with ACI 117. Measure floor finish tolerance within 72 hours after floor finishing and before removal of supporting formwork or shoring. Levelness tolerance (SOF_L) is not applicable to un-shored suspended floors.
- Type C Slabs to receive future waterproofing membrane or insulation with topping slabs shall have a floated finish in accordance with 5.3.4.2(b).
- Type D Slabs to receive future topping slabs bonded to base slab shall be finished in accordance with 5.3.4.2(f).
- Type E Stair treads and landings, interior or exterior, shall receive a light broom finish, finished to a manual straightedge 'flat' tolerance per ACI 117 (1/4 in. in 10 feet).
- 5.3.5.1 Where not otherwise shown on Drawings, provide control joints in slabs on grade at column centerlines and at the following maximum spacing:
- (a) Slabs less than 5 in. thick – 12 ft. c/c
 - (b) Slabs 5 in. to 8 in. thick – 16 ft. c/c
 - (c) Topping slabs – 8 ft. c/c
 - (d) Maximum panel width-to-length ratio: 1.5.
- 5.3.6.4(a) When forms are removed prior to 7 days, apply one coat of liquid curing compound to all formed surfaces within an hour of formwork removal.

- 5.3.6.5(e)1 A thin layer of water shall be applied to the slab surface just prior to placement of the waterproof sheet. The sheet shall remain in place for a minimum of 7 days. All edges and laps of the waterproof sheet shall be weighted down. All tears in the sheet shall be immediately repaired and the concrete surface re-wetted so that no portion of the concrete surface remains uncovered and all portions of the concrete surface remain continuously moist.
- 5.3.6.5(f)1 Apply curing compound to flatwork in two coats at right angles to each other per manufacturer's recommendations. Total application rate shall be in accordance with manufacturer's recommendations, but not less than 1 gal./200 ft². For rough surfaces, such as broom or scratch finishes, increase application rate per manufacturer's recommendations, but by not less than 50%.
- a. Correct coverage shall be maintained by the applicator and determined through accurate measurement of the material and the number of square feet to which it is applied.
 - b. Curing compound shall also be applied to formed surfaces, including beam and slab soffits, per manufacturer's recommendations when forms are removed sooner than 7 days after concrete is cast.
- 5.3.6.5(g) Unless otherwise noted, preservation of moisture in concrete shall be by application of a curing compound satisfying the requirements of 5.2.1.2. Apply the curing compound in accordance with 5.3.6.5(f)1.
- 5.3.6.5(h) Where curing compound will not be compatible with applied finishes or is not permitted because of proximate occupancy, application of water-retention sheeting materials per 5.3.6.5(e) or a continuous wet cure per 5.3.6.5(a), 5.3.6.5(b), 5.3.6.5(c) or 5.3.6.5(d) is required. Apply water-retention sheeting materials or wet cure all slabs to receive a bonded topping or bonded waterproof membrane. Wet cure slabs shown on the architectural drawings as requiring a wet cure.
- 5.3.7.1(a) All voids, damaged places, fins, projections, and honeycomb areas shall be removed down to sound concrete and repaired immediately after form removal. Any concrete that is not formed as shown on the contract drawings, is out of alignment or level, or indicates a defective surface or unsoundness of any nature shall be removed and replaced to the limits required by the Architect/Engineer unless permission is granted to patch or otherwise correct the defective work. Permission to patch or attempt the correction shall not be construed as a waiver of the Architect/Engineer's right to require complete removal of the defective work should the patching or correction prove to be, in the opinion of the Architect/Engineer, unsatisfactory either as to structure or appearance.
- 5.3.7.2(a) Grout tie holes with non-shrink grout in below-grade walls. Coat the applied area with the specified bonding agent per the manufacturer's

instructions. **Do not grout tie holes in exposed to view walls unless otherwise noted.**

5.3.7.5(a) Repair materials other than site-mixed portland-cement mortar shall be submitted for approval.

5.3.7.7 All patching materials shall be proportioned to match color of surrounding material after patch material has cured. Prior to starting patching operation, test different techniques, grout mixes, and curing procedures on concealed areas to best match cast concrete. Obtain approval from the Architect/Engineer of patching material and methods prior to proceeding with patching.

Section 6 (ACI 301) – Architectural Concrete

6.1.1.1.1 Surfaces designated as Architectural Concrete on the Drawings shall comply with section 6 of ACI 301.

6.1.1.1.a There is no concrete work designated as Architectural Concrete. However, for exposed concrete that does not receive paint or other finish, comply with 6.3.8 “Formwork Removal” and 6.3.9 “Repair of tie holes and surface defects” of this Section.

Section 8 (ACI 301) – Mass Concrete

8.1.1.1 Concrete which is thicker than 4 feet in its minimum dimension for foundation concrete and thicker than 3 feet in its minimum dimension for concrete above grade, shall be subject to the provisions of this section.

8.2.1.2 Where necessary, use a retarding admixture conforming to ASTM C494, pretested with project materials under project conditions, to prevent cold joints or to help reduce the maximum temperature and rate of temperature rise of the concrete.

8.2.1.3 Do not use accelerating admixtures in mass concrete.

Section 9 (ACI 301) – Post-Tensioned Concrete

9.1.1 Delete this section of ACI 301.

Section 10 (ACI 301) – Shrinkage-Compensating Concrete for Interior Slabs

10.1.1 Delete this section of ACI 301.

Section 11 (ACI 301) – Industrial Floor Slabs

11.1.1 Delete this section of ACI 301.

Section 12 (ACI 301) – Tilt-Up Construction

12.1.1 Delete this section of ACI 301.

Section 13 (ACI 301) – Precast Structural Concrete

- 13.1.1 Delete this section of ACI 301. Where applicable, Precast Structural Concrete is specified in Specification Section 03 41 00 – Precast Structural Concrete.

Section 14 (ACI 301) – Precast Architectural Concrete

- 14.1.1 Delete this section of ACI 301. Where applicable, Precast Architectural Concrete is specified in Specification Section 03 45 00 – Precast Architectural Concrete.

END OF FOREGOING PARAGRAPH 1.8 ENTITLED “SUPPLEMENTAL REQUIREMENTS AND MODIFICATIONS TO ACI 301-16”.

END OF SECTION

SECTION 044213

EXTERIOR STONE CLADDING

PART 1 GENERAL

1.1 WORK INCLUDED

1. Exterior granite cladding and sandstone cladding work, as indicated on the Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-In-Place Concrete.
- B. Section 044302 - Granite.
- C. Section 055000 - Metal Fabrications
- D. Section 071400 – Fluid Applied Waterproofing.
- E. Section 079200 - Sealants.
- F. Section 321440 – Granite Unit Paving.

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):

A 36	Structural Steel
C 119	Standard Terminology Relating to Dimension Stone
C 144	Aggregate for Masonry Mortar
C 150	Portland Cement
C 207	Hydrated Lime for Masonry Purposes
C 270	Mortar for Unit Masonry
C 615	Structural Granite
C 616	Sandstone Building Stone
C 1242	Standard Guide for Selection, Design, and Installation of Dimension Stone Attachment Systems
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
E 699	Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with

Test Methods Promulgated by ASTM Committee E-6.

2. National Building Granite Quarries Association, Inc. (NBGQA): Specifications for Architectural Granite

1.4 DEFINITIONS

- A. Definitions contained in ASTM C 119 apply to this Section.
- B. Dimension Stone Cladding System: An exterior wall covering system consisting of dimension stone panels together with the anchors, backup structure, sheathing, mortar, fasteners, and sealants used to secure the stone to the structure and to produce a weather-resistant covering.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Design stone anchors and anchoring systems according to ASTM C 1242.
- B. Structural Performance: Provide dimension stone cladding system capable of withstanding the effects of gravity loads and the following loads.
 1. Wind Loads: Determine loads based on Code requirements.
- C. Thermal Movements: Provide dimension stone cladding system that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing displacement of stone, opening of joints, overstressing of components, failure of joint sealants and connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.
- D. Safety Factors for Stone: Design dimension stone cladding system to withstand loads indicated without exceeding allowable working stress of stone determined by dividing stone's average ultimate strength, as established by testing, by the following safety factors:
 1. Safety Factors for Granite: 3 for uniform loads and 4 for concentrated loads.
 2. Safety Factors for Quartz-Based Stone: 8 for uniform loads and 10 for concentrated loads.
- E. Design stone anchors to withstand loads indicated without exceeding allowable working stresses established by the following:
 1. Structural Steel: AISC S335, "Specification for Structural Steel Buildings Allowable Stress Design and Plastic Design with Commentary."
 2. Cast-in-Place and Post-installed Fasteners in Concrete: One-fourth of tested capacity when installed in concrete with compressive strength indicated.
 3. Post-Installed Fasteners in Masonry: One-sixth of tested capacity when installed in masonry units indicated.
- F. Control of Corrosion and Staining: Prevent galvanic and other forms of corrosion as well as staining by isolating metals and other materials from direct contact with incompatible materials. Use materials that do not stain exposed surfaces of stone and joint materials.

1.6 SUBMITTALS

- A. Product Data: For each variety of stone, stone accessory, and other manufactured products indicated, including, but not limited to.
 - 1. Expansion joint filler.
 - 2. Grout materials, including additives.
 - 3. Mortar coloring additive.
 - 4. Mortar materials, including additives.
 - 5. Stone anchors
- B. Shop Drawings: Show details of fabrication and installation of dimension stone cladding system, including dimensions and profiles of stone units.
 - 1. Show locations and details of joints.
 - 2. Include details of mortar joints, sealant joints, and mortar joints pointed with sealant.
 - 3. Show locations and details of anchors and backup structure.
 - 4. Indicate locations of inserts for stone anchors and supports, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
 - 5. Indicate the setting number of each piece.
- C. Material Test Reports: From a qualified independent testing agency indicating and interpreting test results of the following for compliance with requirements indicated.
 - 1. Stone Test Reports: For each stone variety proposed for use on Project, provide test data indicating compliance with required physical properties including those specified by reference to ASTM standards. Include test data for flexural strength based on testing according to ASTM C 880, performed on specimens representative of minimum thickness and finish of installed stone, in both wet and dry conditions. Base reports on testing done within previous five years.
 - 2. Anchorage Test Reports: For each variety, finish and anchor type, based on testing according to ASTM C 1354, performed on specimens representative of minimum thickness and finish of installed stone.
 - 3. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer complying with requirements in Section 079200 - Sealants. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.
 - 4. Preconstruction Sealant Field Test Report: From Installer, complying with requirements in Section 079200 - Sealants.
- D. Samples: Submit representative samples of product to be furnished under this Section to Architect for selection and approval, as follows. Delivered materials shall closely match the approved samples.

1. Granite Veneer Facing: Sufficient 12 in. by 12 in. samples to show the full range of color, texture, and finish of granite proposed for use.
 2. Granite Corner Facing: Sufficient 12 in. by 12 in. samples to show the full range of color, texture, and finish of granite proposed for use.
 3. Granite Veneer Accessories: Duplicate samples of cramps, anchors, dowels, and other accessories as may be requested by Architect.
 4. Sandstone Veneer Facing: Sufficient 12 in. by 12 in. samples to show the full range of color, texture, and finish of granite proposed for use.
 5. Sandstone Veneer Accessories: Duplicate samples of cramps, anchors, dowels, and other accessories as may be requested by Architect.
- E. Contractor's Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of the stone supplier, and that the selected materials and construction are proper, compatible with adjacent materials, and adequate for the application shown.

1.7 SAMPLE INSTALLATION

- A. Install at least one sample granite veneer installation and one sample sandstone veneer installation, each conforming to typical project construction.
- B. Sample installations shall each be approximately 50 sq. ft. in area, located as directed by Architect, and shall show the proposed stone type, color, and finish, anchorage/setting system, joint sealing (by other trade), flashings (by other trade), weep holes, and other pertinent details of installation.
- C. Replace sample installation as many times as necessary until Architect's approval of the installation has been obtained. Upon Architect's approval, construct all subsequent stone veneer work to conform to approved sample installation.

1.8 COORDINATION

- A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work.
- B. Do all cutting and drilling to accommodate the work of for the proper completion of the Work.

1.9 DELIVERY, HANDLING, AND STORAGE

- A. Pack and band shipment. Following shipping store granite on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Place and stack pallets to evenly distribute the weight of the granite materials and prevent damage to granite pieces.
- B. Handle stone to prevent chipping, breakage, soiling, staining, or other damage.
- C. Stone damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.

1.10 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the stonework shall be adequately protected from soiling, staining, and other damage.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed dimension stone cladding systems similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
 - 1. Installer's responsibilities include engineering, detailing, fabricating, and installing dimension stone cladding system.
 - 2. Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified structural engineer.
- B. Structural Engineer Qualifications: A structural engineer who is licensed to practice in the State of Ohio, and experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of dimension stone cladding systems that are similar to those indicated for this Project in material, design, and extent, including anchors, attachments and coordination with building structural system.
- C. Source Limitations for Stone: Obtain each variety of stone, regardless of finish, from a single quarry with resources to provide materials of consistent quality in appearance and physical properties.
 - 1. Obtain each variety of stone from a single quarry, whether specified in this Section or in another Section of the Specifications.
- D. Source Limitations for Mortar Materials: Obtain mortar ingredients of uniform quality for each cementitious component from a single manufacturer and each aggregate from one source or producer.
- E. Source Limitations for Other Materials: Obtain each type of stone accessory, sealant, and other material from a single manufacturer for each product
- F. Welding Standards: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel"; and AWS D1.3, "Structural Welding Code--Sheet Steel."

1.12 PRECONSTRUCTION STONE TESTING

- A. Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be made by the Owner. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense. Furnish test specimens that are representative of materials proposed for incorporation into the Work.
 - 1. Physical Property Tests: For each stone variety proposed for use on Project, tested for compliance with physical property requirements, other than abrasion resistance, according to referenced ASTM standards.
 - 2. Flexural Strength Tests: For each stone variety, thickness, orientation of cut, and finish, proposed for use on Project, tested according to ASTM C 880, in both wet and dry conditions.

3. Anchorage Tests: For each stone variety, orientation of cut, finish, and anchor type proposed for use on Project, tested according to ASTM C 1354
4. Testing agency will report test results in writing to Construction Manager, Architect and Contractor.

1.13 PROJECT CONDITIONS

- A. Cold-Weather Construction: Do not use frozen materials or materials mixed or coated with ice or frost. Remove and replace dimension stone cladding damaged by frost or freezing conditions. When ambient temperature is within limits indicated, use the following procedures:
 1. At 40 deg F and below, produce mortar temperatures between 40 and 120 deg F by heating mixing water and, at temperatures of 32 deg F and below, sand. In heating mortar materials, maintain mixing temperatures within 10 deg F do not heat water to above 160 deg F. Maintain temperature of mortar on boards above freezing. Do not apply mortar to stone units or substrates below 32 deg F.
 2. At 25 to 20 deg F heat both sides of walls under construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
 3. Below 20 deg F: Provide enclosure and auxiliary heat to maintain air temperature above 32 deg F within enclosure. Heat stone so it is above 40 deg F at time of installation.
- B. Cold-Weather Protection: When mean daily temperature is within limits indicated, provide the following protection:
 1. 40 to 25 Deg F : Cover dimension stone cladding with a weather-resistant membrane for 48 hours after construction.
 2. 25 to 20 Deg F: Cover dimension stone cladding with insulating blankets or provide enclosure and heat to maintain air temperature above 32 deg F within enclosure for 48 hours after construction. Use windbreaks or enclosures when wind velocity exceeds 15 mph.
 3. Below 20 Deg F: Provide enclosure and heat to maintain air temperature above 32 deg F within enclosure for 48 hours after construction.

PART 2 PRODUCTS

2.1 GRANITE

- A. Granite shall be of the sizes and dimensions indicated on the Drawings.
- B. Use only one source of granite throughout the entire project. Acceptable sources of granite are specified below; other sources will be reviewed according to substitution requirements specified in the Conditions of the Contract.
 1. Granite Types and Sources:
 - a. "Prairie Brown", "Deer Isle" and "Atlantic Black" granite, quarried by Cold Spring Granite at Isle, MI, or approved equal.

- b. Finish: Diamond 10, Rock Face, and Thermal, as indicated on the Drawings, to match Architect's sample.
- C. Flatness Tolerances: Variation from true plane, on flat surfaces, shall be determined by use of a 4 ft. long straightedge applied in any direction on the surface. Such variations at the bed and joint arris lines shall not exceed 3/64 inch, or 1/6 of the specified joint width, whichever is greater. Variations from true plane on other parts of the face surfaces shall not exceed 3/64 in.
- D. Beds and Joints: Pieces shall be bedded and jointed as shown on the approved shop drawings, and bed joint and vertical joint surfaces shall be cut with 3/16 in. beds and joints, as indicated on the approved shop drawings, sawn or cut full square back from the face at least two-thirds of the piece thickness. From that point the bed may fall under square not more than 1 in.
- E. Back of granite which will be concealed in the finished work shall be sawn to approximately true planes. Maximum variation in thickness shall be 3/16 in.
- F. All faces, shall be at right angles to the plane of the top.
- G. Granite shall be accurately cut to required shape and dimensions.
- H. Holes, cut-outs, sinkages and openings in granite work for anchors, cramps, dowels, supports, and lifting devices, shall be accurately cut or drilled to required dimensions, as shown on the approved shop drawings, and as necessary to secure granite in place. Setting beds shall be shaped to fit supports.
- I. Arrises shall be cut sharp and true to square, and continuous with adjoining arrises. Where exposed, arrises shall be eased.

2.2 SANDSTONE

- A. "Pleasant Hill Buff - Chat Sawn", supplied by The Briar Hill Stone Company, 12470 State Route 520, P.O. Box 457, Glenmont, OH 44628.
- B. Sandstone shall be sound, durable, properly quarried, free from reeds, rifts, seams, laminations and minerals which by weathering would cause discolorations or deterioration. They shall be of a size, quality and color acceptable to the Architect. Stones shall be so quarried that the stratification will be radial or parallel to bed when set in place except where split face or seam face finish is shown on the Drawings.
 - 1. Sandstone shall comply with ASTM C 616. Classification II.
 - 2. Color of stone shall be "Light".
 - 3. Finish: Chat Sawn.
- C. Sandstone units shall have the following properties:
 - 1. A minimum average compressive strength of 10,000 psi when dry and 7,500 psi when wet as determined by ASTM C 170. Average values will be based upon the test results of at least 5 samples from each proposed source of stone. The Architect may require additional tests, if in his opinion, the quality of stone changes as work proceeds.
 - 2. Maximum percentage of wear, Los Angeles Abrasion Test (ASTM C 535) - 40 percent by weight.

3. Maximum loss, Magnesium Sulfate Soundness Test, 5 cycles (ASTM C 88) - 15 percent by weight.
 4. Maximum absorption by weight, (ASTM C 97) - 3 percent.
 5. Minimum density (ASTM C 97) 150 lb./ft.³.
 4. Minimum abrasion resistance (ASTM C 241) 8.
- D. Sandstone shall be cut to exact dimensions prior to shipment to the project site.

2.3 STONE FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawings.
1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."
- B. Control depth of stone and back check to maintain minimum clearance indicated between backs of stone units and surfaces of backup walls, and other work behind stone.
- C. Dress joints (bed and vertical) straight and at right angle to face, unless otherwise indicated. Shape beds to fit supports.
- D. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place.
- E. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
- F. Cut stone to produce uniform joints 3/8 inch (10 mm) wide and in locations indicated.
- G. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.
- H. Clean backs of stone to remove rust stains, iron particles, and stone dust.
- I. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved samples and mockups.

2.4 ANCHORS AND SUPPORT STRUCTURE

- A. Fabricate anchors, including shelf angles, from stainless steel, ASTM A 666, Type 316, temper as required to support loads imposed without exceeding allowable design stresses.
1. Fasteners for Stainless-Steel Anchors: Annealed stainless-steel bolts, nuts, and washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 2.
 2. Hydrogen Embrittlement: Coat anchors to prevent hydrogen embrittlement.

- B. Cast-in-Place and Post-Installed Fasteners for Concrete and Masonry: Type indicated below, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Adjustable Inserts Embedded in Concrete: Steel, cast iron, or malleable iron, with bolts, nuts, washers, and shims; all hot-dip galvanized or mechanically zinc coated.
 - 2. Post-installed Fasteners for Concrete and Masonry: Chemical anchors made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 316, for anchors.

2.5 STONE ACCESSORIES

- A. Setting Buttons: Lead or resilient plastic buttons, non-staining to stone, sized to suit joint thicknesses and bed depths of stone units without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting button.
- B. Setting Shims: Strips of resilient plastic non-staining to stone, sized to suit joint thicknesses and depths of stone supports without intruding into required depths of joint sealants or causing third-side adhesion between sealant and setting shims.
- C. Concealed Sheet Metal Flashing: Stainless steel or zinc coated copper.
- D. Weep and Vent Tubes: Rectangular, cellular, polypropylene or clear butyrate extrusion, 3/8 by 1-1/2 inches and of length required to extend from exterior face of stone to cavity behind.
- E. Plastic Weep Hole/Vent: One-piece, flexible extrusion manufactured from ultraviolet- resistant polypropylene copolymer, designed to weep moisture in masonry cavity to exterior, in color selected from manufacturer's standard.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions under which work is to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 SETTING DIMENSION STONE CLADDING, GENERAL

- A. Execute dimension stone cladding installation by skilled mechanics and employ skilled stone fitters at Project site to do necessary field cutting as stone is set.
 - 1. Use power saws with diamond blades to cut stone. Produce lines cut straight and true, with edges eased slightly to prevent snipping.
- B. Set stone to comply with requirements indicated on Drawings and Shop Drawings. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure dimension stone cladding in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances.
- C. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.

1. Sealing expansion and other joints is specified in Section 079200 – Sealants.
 2. Keep expansion joints free of mortar and other rigid materials.
- D. Install concealed flashing at continuous shelf angles, lintels, ledges, and similar obstructions to downward flow of water to divert water to building exterior.
- E. Keep cavities open where unfilled space is indicated between back of stone units and backup wall; do not fill cavities with mortar or grout.
- F. Place weep holes and vents in joints where moisture may accumulate, including base of cavity walls, above shelf angles, and flashing. Locate weep holes and vents at intervals not exceeding 24 inches and for those serving as vents only, at intervals not exceeding 60 inches horizontally and 20 feet vertically.

3.3 INSTALLATION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of walls, do not exceed 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch in 40 feet or more. For external corners, corners and jambs within 20 feet of an entrance, expansion joints, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch in 40 feet or more.
- B. Variation from Level: For lintels, sills, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 3/8 inch maximum.
- C. Variation of Linear Building Line: For positions shown in plan and related portions of walls and partitions, do not exceed 1/4 inch in 20 feet or 1/2 inch in 40 feet or more.
- D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/4 inch.
- E. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or a quarter of nominal joint width, whichever is less.
- F. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/16-inch difference between planes of adjacent units.

3.4 SETTING MECHANICALLY ANCHORED DIMENSION STONE CLADDING

- A. Attach anchors securely to stone and to backup surfaces. Comply with recommendations in ASTM C 1242.
- B. Attach framing for stone support system to structural frame of building, at connection points indicated, by welding or bolting to comply with the following:
1. Weld connections to comply with AWS D1.1, "Structural Welding Code--Steel."
 2. Fabricate joints to exclude water or to permit its escape to building exterior, at locations where water could accumulate because of condensation or other causes.
 3. For galvanized surfaces, clean welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

4. For shop-painted surfaces, clean field welds, bolted connections, and abraded areas immediately after erection. Apply paint to exposed areas using same material as used for shop painting.
- C. Fill anchor holes with sealant.
 1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.
- D. Set stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of stone a distance at least equal to width of joint.

3.5 SETTING DIMENSION STONE CLADDING WITH MORTAR

- A. Set stone in full bed of mortar with head joints slushed full, unless otherwise indicated.
 1. Use setting buttons of adequate size, in sufficient quantity, and of thickness required to maintain uniform joint width and to prevent mortar from extruding. Hold buttons back from face of stone a distance at least equal to width of joint.
 2. Do not set heavy units or projecting courses until mortar in courses below has hardened enough to resist being squeezed out of joint.
 3. Support and brace projecting stones until wall above is in place and mortar has set.
 4. Provide compressible filler in ends of dowel holes and bottoms of kerfs to prevent end bearing of dowels and anchor tabs on stone. Fill remainder of anchor holes with mortar.
- B. Embed ends of sills in mortar; leave remainder of joint open until final pointing.
- C. Rake out joints for pointing with mortar to depths of not less than 1/2 inch. Rake joints to uniform depths with square bottoms and clean sides.
- D. 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 first layer of pointing mortar in layers not more than 3/8 inch until a uniform depth is formed; compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- E. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch.
- F. Tool joints with a round jointer having a diameter 1/8 inch larger than width of joint, when pointing mortar is thumbprint hard.
- G. Sealant Pointed Joints: Rake out mortar from sealant-pointed joints to depths of not less than 1/2 inch (12 mm) nor less than that required for sealant and sealant backing. Rake joints to uniform depths with square bottoms and clean sides.

3.6 CLEANING

- A. Upon completion of stone work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Architect.

- B. Remove and replace broken, chipped, stained, or otherwise damaged stone, defective joints, and dimension stone cladding that does not match approved samples and mockups. Damaged stone may be repaired if Architect approves methods and results.
 - C. Replace in a manner that results in dimension stone cladding's matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
 - D. In-Progress Cleaning: Clean dimension stone cladding as work progresses. Remove mortar fins and smears before tooling joints.
 - E. Clean dimension stone cladding no fewer than six days after completion of pointing and sealing. Use clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage stone.
1. Expansion joints and other joints to receive sealant shall be cleaned of all mortar and left ready for sealing of joints.

END OF SECTION

SECTION 044302

GRANITE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Solid granite block capstones, granite curbs, and solid granite stairs, as indicated on the Drawings as specified herein.

1.2 RELATED SECTIONS

1. Section 033000 - Cast-in-Place Concrete. Section 044213, Exterior Stone Cladding.
2. Section 044312 – Exterior Stone Cladding
3. Section 057000 - Ornamental Metals
4. Section 071400 - Fluid Applied Waterproofing.
5. Section 079000 - Expansion Joints
6. Section 079200 - Sealants
7. Section 321440 - Granite Unit Paving.

1.3 REFERENCES

- A. Comply with requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
 1. American Society for Testing and Materials (ASTM):
 - C 144 Aggregate for Masonry Mortar
 - C 150 Portland Cement
 - A 167 Stainless and Heat Resisting Chromium-Nickel Steel
 - C 207 Hydrated Lime for Masonry Purposes
 - C 279 Mortar for Unit Masonry
 - C 615 Structural Granite
 - D 1752 Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
 2. National Building Granite Quarries Association, Inc. (NBGQA), Specifications for Architectural Granite.

1.4 SUBMITTALS

- A. Samples: Granite sample shall demonstrate color, shade, veining, texture, range, and finish. Samples of the following shall be submitted:

<u>Item</u>	<u>Quantity and Size</u>
Dowels	One each of each size, 4in. length
Granit Stair	One section required, full thickness x full width x 4ft. long specified color and finish.
Granite Curb	One 4 ft. long section required, full height x full width, specified color and finish.
Granite Cap Stone (flat)	One section required, full thickness x full width x 2 ft. long, specified color and finish.
Granite Cap Stone (sloped)	One section required, full thickness x full width x 2 ft. long, specified color and finish.
Mortar Grout	Cured sample, 2 in. x 2 in. of selected color.

B. Manufacturer's Product Data:

1. Expansion joint filler.
2. Grout materials, including additives.
3. Mortar coloring additive.
4. Mortar materials, including additives.

C. Shop Drawings: Cutting and setting drawings of granite pieces.

1. Indicate sizes, dimensions, layout, finishes, edging, radius edges, arrangement and provisions for jointing, anchoring, cut-out and holes, and other necessary details for reception of other work.
2. Indicate locations of inserts for stone anchors and supports which are to be built into concrete, and locations and dimensions of cut-outs, holes, openings, and other provisions required for the work of other trades.
3. Indicate the connections from stone to stone creating a monolithic granite bench and granite steps.
4. Indicate the setting number of each piece with each piece bearing the corresponding number in a non-staining paint.

D. Contractor's Review: Before commencing work, submit signed statement that Contract Documents have been reviewed with a qualified representative of granite supplier, and that selected materials and construction are proper, compatible, and adequate for application shown.

E. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:

1. Compressive strength, psi. (ASTM C 170)
2. Density, lbs./c.f. (ASTM C 97)
3. Absorption by weight, % (ASTM C 97)

4. Abrasion resistance (ASTM C 241)
5. Flexural strength psi, (MPa) (ASTM C 880)
6. Modulus of Rupture (ASTM C 99).

1.5 SAMPLE INSTALLATIONS

- A. Provide sample step installation. Sample shall show the proposed granite type, color, and finish, setting system, relationship to paving, jointing and other pertinent details of installation.
- B. Replace sample installation as many times as necessary until Architect's approval of the installation has been obtained. Upon Architect's approval, construct all subsequent granite work to conform to approved sample installation.

1.6 COORDINATION

- A. Coordinate work with that of other sections affected by this work.
- B. Perform cutting and drilling to accommodate work of other sections, as indicated or inferred from Contract Documents Specifications, for the proper completion of the work.

1.7 DELIVERY, HANDLING, AND STORAGE

- A. Pack and band shipment. Following shipping store granite on wood skids or pallets, covered with non-staining, waterproof membrane and protected from the weather. Place and stack pallets to evenly distribute the weight of the granite materials and prevent damage to granite pieces.
- B. Store to allow air to circulate around the granite material. Do not place in contact with the ground during storage.
- C. Handle to prevent chipping, breakage, soiling, or other damage. Granite units shall be lifted with wide-belt type slings wherever possible. Do not use wire rope or ropes containing tar or other substances which might cause staining or damage to granite finish.
- D. Granite damaged in any manner will be rejected and shall be replaced with new materials at no additional cost to the Owner.

1.8 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the granite work shall be adequately protected from soiling, staining, and other damage.

1.9 QUALITY ASSURANCE

- A. Granite shall be supplied by a source approved by the Architect.
- B. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBCQA Specifications, except as modified herein.

1.10 JOB CONDITIONS

A. Cold Weather Protection:

1. Remove any ice or snow formed on granite or concrete bed by carefully applying heat until top surface is dry to touch.
2. Remove granite work determined to be damaged by freezing conditions.
3. Perform the following construction procedures while work is progressing.

<u>Air Temperature</u>	<u>Procedures</u>
40° – 32°F.	Heat sand to produce mortar temperatures between 40° and 120 F.
32° – 25°F.	Heat sand to produce mortar temperatures between 40° and 120 F. Maintain temperature of mortar on boards above freezing.
25° – 20°F.	Heat sand to produce mortar temperatures between 40° and 120 F. Maintain temperature of mortar on boards above freezing. Use wind breaks when wind is in the excess of 15 mph.
20° – below	Heat sand to produce mortar temperatures between 40° and 120 F. Provide enclosures and auxiliary heat to maintain air temperature above 32°F. Do not lay units which have a surface temperature below 20°F.

4. Latex admixture shall be kept at 40°F. minimum.

B. Cold Weather Protection for Completed Granite Work:

Mean Daily

<u>Air Temperature</u>	<u>Procedures</u>
40° – 32°F.	Protect granite work from rain or snow for at least 24 hours by covering with weather-resistive membrane.
32° – 25°F.	Completely cover granite work with weather-resistive membrane for at least 24 hours.
25° – 20°F.	Completely cover granite work with insulating blankets or similar protection for at least 24 hours.
20° – below	Maintain granite work at temperature above 32°F. for 24 hours using enclosures and supplemental heat.

1. Do not use frozen materials or materials mixed or coated with ice or frost. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents, and do not use calcium chloride in mortar or grout.
2. Do not build on frozen work; remove and replace granite work damaged by frost or freezing.
3. During all seasons, protect partially completed granite work against weather when work is not in progress.

PART 2 PRODUCTS

2.1 GENERAL STANDARDS

A. Quarrying Supervision:

1. Supervise and coordinate quarry work by the granite fabricator to ensure that the as-quarried block orientations yields finished material with characteristics as described herein.
2. Granite shall be cut from matched blocks. Matched blocks shall mean blocks extracted from a single bed of stratum in the quarry. The use of blocks chosen at random, though similar in general character and color to that of the approved granite will not be permitted.

B. Examinations

1. Examination at the Quarry: Quarried blocks shall be made available for inspection by the Architect at its request.
2. Examination at the Fabrication Plant: Production units shall be made available for inspection by the Architect at his request. Advise the Architect when production has begun and of the earliest possible opportunity to inspect a representative sampling of production work.

C. Criteria for Granite

1. Visual: All examinations, selections, and approvals shall be for the purpose of achieving a final appearance of granite with greatest possible uniformity, and will be based upon the following criteria:
 - a. Granite shall be of sound stock and uniform texture, and shall be free from holes, seams, shakes, clay pockets, spalls, stains, starts, and other defects which would impair the strength, durability and appearance of the work, as determined by the Architect.
 - b. Inherent variations characteristic of the granite and the quarry from which the granite is to be obtained shall be brought to the attention of the Architect at the time the samples are submitted for approval, and shall be subject to approval of the Architect.
 - c. Select granite for background color, veining, marking and matching, shall run in even shades, and set accordingly.

D. Granite materials rejected for non-compliance with these standards shall be replaced at no additional cost to the Owner.

2.2 STONE FABRICATION

- A. General: Fabricate stone units in sizes and shapes required to comply with requirements indicated, including details on Drawings and Shop Drawing.
 1. Comply with recommendations in NBGQA's "Specifications for Architectural Granite."
- B. Cut and drill sinkages and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone securely in place; shape beds to fit supports.
- C. Cut stone to produce pieces of thickness, size, and shape indicated. Comply with specified fabrication and construction tolerances for faces, edges, beds, and backs.

- D. Contiguous Work: Provide chases, reveals, reglets, openings, and similar features as required to accommodate contiguous work.
- E. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match approved samples and mockups.
- F. Inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.
 - 1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors or appearance characteristics represented in approved samples and mockups.
- G. Flatness Tolerance: Variation from true plane, or flat surfaces, shall be determined by use of a 4 ft. long straightedge, applied in any direction on the surface. Variations on polished, honed and fine rubbed surfaces at the bed and joint arris lines shall not exceed 3/64 of an inch or 1/16 of the specified joint width, whichever is greater. On surfaces having other finishes the maximum variation from true plane shall not exceed 1/4 of the specified joint width.
- H. Variations from true plane on other parts of face surfaces shall not exceed the following:
 - 1. 4-cut and sawn fishiness. 1/8 in.
 - 2. Thermal and course stippled sandblasted finishes. 3/16 in.
- I. Backs and pieces shall be sawn or roughly dressed to approximate true planes. Maximum variation in thickness from the specified shall not exceed the following:
 - 1. 1/2 in. on pieces above 3 in. modular thick.

2.3 GRANITE

- A. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBGQA Specifications.
 - 1. Granite shall be sound and uniform in quality, texture, and strength, and shall be free of any flaws, reeds, rifts, laminations, seams, or defects which would impair its strength, durability, or appearance.
 - a. Absorption by weight shall not exceed 0.4%.
 - b. Compressive strength of not less than 19,000 psi.
 - c. Minimum density of 160 pcf.
 - 2. Granite Types and Sources:
 - a. Subject to compliance with requirements, provide the following granites: "Prairie Brown", "Deer Isle" and "Atlantic Black" granite, quarried by Cold Spring Granite at Isle, MI, or approved equal.
 - b. Finish: Diamond 10, Rock Face, and Thermal, as indicated on Drawings, to match Architect's sample.
- B. Granite shall be of the sizes and dimensions indicated on the Drawings.

- C. All faces shall be at right angles to the plane of the top.
- D. Granite shall be cut accurately to required shapes and dimensions.

2.4 MORTAR BED

- A. Mortar bed shall consist of thick set latex modified bed with high strength latex modified bond coat.
- B. Thick Set Mortar bed: Setting bed mortar shall conform to ASTM C 270, Type S, except that latex polymer additive shall be mixed with cementitious materials and aggregate in lieu of water.
 - 1. Cement shall conform to ASTM C 150, Type I, complying with the staining requirements of ASTM C 91 for not more than 0.03% water soluble alkali. Furnish Type I, except Type III may be used for setting granite in cold weather.
 - 2. Sand shall conform to ASTM C 144.
 - 3. Hydrated lime shall conform the ASTM C 207.
 - 4. Latex polymer additive shall be equal to "Laticrete 3701" setting liquid, manufactured by Laticrete International, Inc., Woodbridge, CT 06525. Mix according to manufacturer's instructions.
- C. High Strength Bond Coat: High strength bond coat between concrete base slab and setting bed mortar, and between setting bed mortar and granite paver shall be equal to "Laticrete 4237 Latex Additive", a specially designed latex additive for use with Laticrete 211 Powder to make high strength latex slurry bond coat for mortar bed, manufactured by Laticrete International, Inc., One Laticrete Park North, Bethany, CT, or approved equal. Mix according to manufacturer's instructions.

2.5 SEALANT FOR EXPANSION JOINTS

- A. Provide high performance silicone sealant. Refer to Section 079200 - Sealants.

2.6 EXPANSION JOINT FILLER

- A. Performed expansion joint filler shall be a non-extruding, resilient, non-bituminous type, conforming to ASTM D 1752, Type II.

2.7 ANCHORAGE AND SETTING MATERIALS

- A. Pins, Dowels, Anchor Bolts, Nuts, Washers, and Shims: Fabricate from AISI Type 302/304 stainless steel.
- B. Stone Anchors: Dovetail slots, anchors, dowels, shims, and other metal items required for the support and anchorage of the sandstone work shall be furnished under this Section for type and size required to securely anchor and fasten stonework in place. Fabricate anchors and dowels from Type 302/304 stainless steel.
- C. Epoxy adhesive for fastening stainless steel dowels into adjoining granite pieces and/or concrete foundations shall be two-component, 100% solids, moisture-insensitive, high-modulus, high strength, structural, epoxy paste adhesive conforming to ASTM C 881, similar to "Sikadur 31, Hi-Mod Gel", manufactured by Sika, Glendale Heights, IL 60139, or approved equal.

- D. Provide lead or plastic setting buttons sized to maintain uniform joints.

PART 3 EXECUTION

3.1 ACCEPTABILITY OF EXISTING CONDITIONS

- A. Contractor shall examine the existing conditions to determine its adequacy to receive granite unit and mortar setting bed. Evidence of inadequate condition shall be brought to the immediate attention of the Construction Manager.

3.2 SETTING – MORTAR BED

- A. The grades need to be staked, elevations confirmed and reviewed by the Architect before granite is to be set.
- B. Granite units with chips, cracks, stains, or other defects which might be visible in the finished work shall not be used.
- C. Before setting, granite shall be clean and free of dirt, and foreign matter on all sides. Granite shall be dry before setting.
- D. Granite shall be set true to the required lines and grades. Joints shall be uniform in thickness. Expansion joints shall be 1/2 in. wide. Unless otherwise indicated on the Drawings all other joints shall be 1/4 in. wide. Direct bearing contact between granite pieces shall be prohibited.
- E. Before setting, the back of each granite piece shall be dampened and shall receive a slurry of mortar to ensure maximum contact with mortar bed.
- F. Each piece shall be carefully bedded in a full bed of mortar and tapped home with a rawhide mallet to a full and solid bearing.
- G. Exposed surfaces shall be kept free from mortar at all times. Any mortar smears shall be immediately removed with a clean sponge and clean water before latex modified mortar can set.
- H. Holes, slots, and other sinkages for anchors, and dowels, shall be completely filled with mortar during setting of granite.
- I. All joints shall be pointed with joint sealant to be uniform in appearance, texture, and color.
- J. Granite sections shall be set according to the details and locations indicated on the Drawings.
- K. Expansion joints shall be located as indicated on the Drawings. Expansion joint shall be 1/2 in. wide. Performed joint filler shall be installed between granite units at expansion joint locations. Expansion joints shall be sealed in accordance with Section 079200 – Sealants.

ADJUST AND CLEAN

- A. Replace granite pieces which are broken, chipped, stained, or otherwise damaged.
- B. Remove and replace units which are misaligned or not to grade or do not match adjoining stone work.
- C. Provide new matching units, install as specified to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- D. Exposed surfaces shall be kept free from mortar at all times. Any mortar smears shall be immediately removed with a clean sponge and clean water before mortar can set.
- E. Final Cleaning: Only proprietary cleaners shall be used. After mortar is thoroughly set and cured but not longer than 14 days, clean stone as recommended by the stone quarrier and fabricator.
 - 1. Large mortar smears should have been removed as part of the daily in progress cleaning; only dust and light staining should remain for the final cleaning.
 - 2. Test cleaning method on an inconspicuous area of the site wall. Obtain Architect's approval of sample cleaning before proceeding.
 - 3. Protect adjacent surfaces from contact with cleaning solution.
 - 4. Wet wall surfaces with water before application of cleaners. Clean stone by bucket and brush hand cleaning method described in BIA Technical Note No. 20 revision II using job-mixed detergent solution. After appropriate "dwell time", remove cleaning agent by rinsing thoroughly with clean water.
 - 5. The use of muriatic acid is prohibited.
- F. Upon completion of granite work, surfaces shall be left in a clean, unsoiled condition, acceptable to the Architect.

3.3 PROTECTION

- A. Protected Granite work until final acceptance by the Owner.
- B. After the granite work has been installed, it shall be properly and adequately protected from damage. Boxing or other suitable protection shall be provided by Contractor wherever required. However, no lumber which may stain or deface the granite shall be used. Nails shall be high-quality galvanized or non-rusting.

END OF SECTION

SECTION 055000

METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vehicular railings and guards.
- B. Non-stainless steel bollards.
- C. Non-stainless handrails and guardrails.
- D. Equipment enclosures, and gates.
- E. Bent plate pipe guards.
- F. Other steel non-structural fabrication items indicated on drawings.
- G. All accessories, attachment, anchors, and rough hardware for miscellaneous metal work.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 057000 – Ornamental Metals.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design handrails and guardrails, including comprehensive engineering analysis, by a qualified professional engineer using performance requirements and design criteria indicated.
- B. Structural Performance:
 - 1. Handrails and Top Rails of Guardrails:
 - a. Uniform load of 50 lb/ft. applied in any direction.
 - b. Concentrated load of 200 lb. applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guardrails:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface

temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 degree Fahrenheit, ambient; 180 degree Fahrenheit, material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 REFERENCES

- A. The following codes and standards are hereby incorporated as part of the Project Specifications. These codes and standards, including all supplements, apply to all structural steel and miscellaneous metals work as if fully reproduced herein. Modifications in this Specification, when in conflict with the referenced codes and standards, shall take precedence over the referenced codes and standards.
1. Ohio Building Code – 2017, with updates.
 2. American Institute of Steel Construction (AISC) 303-16: "Code of Standard Practice for Steel Buildings and Bridges," June 15, 2016, as modified by the project drawings and this specification; and modifications in Part 4 at the end of this section.
 3. ANSI/AISC 360-16: "Specification for Structural Steel Buildings" and including the "Commentary on the Specification for Structural Steel Buildings", July 7, 2016
 4. American Welding Society (AWS) Structural Welding Code - Steel, ANSI/AWS.
 5. ASTM A6 - General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.
 6. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.
 7. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 8. ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

1.4 SUBMITTALS

- A. Submit shop drawings of all miscellaneous metal items indicating fabrication, assembly and erection detail, member sizes, fastenings, supports and anchors, clearances, coating, and all necessary connections to adjacent work.
1. Submit setting drawings, templates, and directions for installation of anchorage items.

2. Submit manufacturer's product data for proprietary products specified herein.

3. For expansion bolts, submit manufacturer's certificate of performance.

1.5 QUALITY ASSURANCE

- A. All welds, welding operators, tackers and inspectors shall be fully qualified in accordance with the requirements of the American Welding Society for the type of work they are to perform. Copies of certification shall be submitted prior to performing that work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Material Storage: Protect miscellaneous metal and packaged materials from corrosion and deterioration. Store off ground and pitched to drain off water.
- B. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

1.7 PROJECT CONDITIONS

- A. Field measure as required for work fabricated to fit job conditions. Allow for trimming and fitting wherever fabrication might delay work.
- B. Determine correct detailing and design to anticipate deflection and curing of concrete and masonry structures to be attached.

1.8 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Rolled Steel Plates, Shapes and Bars: ASTM A36 unless otherwise noted on Drawings.
- B. Steel Pipe: ASTM A53, Type E or S, Grade B.

- C. Steel Tube: ASTM A500, Grade B.
- D. Threaded Fasteners: ASTM A325, high strength, unless otherwise indicated. Provide hexagonal heads and nuts with washers.
- E. Galvanizing Repair Paint: ZRC Chemical Products Company "ZRC Cold Galvanizing Compound."
- F. Adhesive Anchors: HVA Adhesive Anchor System as manufactured by the Hilti Corporation. Anchors and hardware to be stainless steel unless otherwise noted.
- G. Expansion Anchors: Stainless steel, by WEJ-IT or REDHEAD.
- H. Pipe Rails: Steel pipe conforming to ASTM A53, Type E or S, Grade B.
- I. Grout Under Steel Bearing Plates: Pre-mixed, factory-packaged, nonmetallic, nonshrink, non-staining, noncorrosive, nongaseous grout complying with CRD-621 and ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- J. Steel Bollards: 6-inch diameter heavy weight galvanized steel pipe.
 - 1. Type 1: Set in concrete as indicated on drawings; concrete fill per Mix Type B in Section 033000.
 - 2. Type 2: Shop weld bollard to steel plate, set on 1-inch nonshrink grout, anchored to floor slab as indicated on drawings. Nuts, bolts, washers, and plates to be galvanized.
- K. Vehicular Guard Rails: Wide flange steel shape; provide posts, plates and other items required for support as shown on drawings; all components galvanized.
- L. Pipe Guards: ¼" thick x 12" wide galvanized bent steel plate; fit flat against wall or column at both ends; fit around pipe with 2" clearance between pipe and guard. Drill each end for anchor bolts.

2.2 FABRICATION

- A. General:
 - 1. Fabricate items in accordance with this Specification, referenced codes and standards, Drawings and final shop drawings.
 - 2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 - 3. Complete shop assembly, including connections and welding of units, before start of galvanizing operations.

B. Connections:

1. Provide welded shop connections unless otherwise shown.
2. Provide bolted field connections unless otherwise shown.
3. Provide A325 high strength bolts unless noted otherwise.
4. Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.
5. Welding: Contractor shall determine appropriate welding materials and procedures for the base metals involved for all welding. Materials and procedures to be in accordance with AWS requirements.

C. Fabricate railing assemblies to meet requirements of the Ohio Building Code.

D. Surface Preparation: Prepare ferrous metal surfaces prior to galvanizing to comply with minimum requirements of SSPC-SP6 "Commercial Blast Cleaning." Refer to Specification Section 099100 for additional requirements.

E. Primer Refer to Specification Section 099100 – Painting.

F. Galvanized Finish:

1. ASTM A153 for galvanizing iron and steel hardware.
2. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
3. ASTM A385 and A386 for galvanizing assembled steel products.

PART 3 EXECUTION

3.1 PREPARATION

A. Examine the areas and conditions under which miscellaneous work is to be installed and notify Architect in writing of conditions detrimental to the proper and timely completion of the work.

1. Do not proceed with the work until satisfactory conditions have been corrected.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

3.2 ERECTION

A. Comply with this Specification, referenced codes and standards, Drawings, and final

shop drawings.

- B. Grind coating prior to field welding galvanized materials.

3.3 INSTALLATION

- A. Install work in conformance with approved shop drawings and manufacturer's recommendations.
- B. Grind coating prior to field welding galvanized materials.
- C. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Install supporting members, fastenings, hangers, bracing, brackets, straps, bolts, angles, and other required accessories to set work. Except where otherwise specified for particular items or for built-in work, secure to masonry with expansion or toggle bolts.
- E. Steel Bollards:
 - 1. General: Set posts plumb and level. Fill with concrete, Mix Type B per Section 033000, and round off top.
 - 2. Type 1: Set posts into concrete base as indicated on drawings.
 - 3. Type 2: Secure setting anchors. Set posts level and plumb onto grout, and secure with anchors. Pack grout joints full and in contact with all surfaces. Finish exposed grout edges; bevel at 45 degrees angle.
- F. Vehicular Guard Rails:
 - 1. General:
 - a. Install in compliance with approved shop drawings.
 - b. Set railings accurately in location, alignment, and elevation; measured from established lines and levels, and free of rack.
 - c. Align rails so variations from level do not exceed 1/4" in 12 feet.
 - 2. Secure setting anchors as indicated on drawings.
 - 3. Set posts level and plumb onto grout, and secure with anchors.
 - 4. Pack grout joints full and in contact with all surfaces. Finish exposed grout edges; bevel at 45 degrees angle.
 - 5. Adjust railings before anchoring to ensure matching proper alignment.
 - 6. Nonwelded connections: Use mechanical or adhesive joints for permanently connecting railing components.

- 7. Welded connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Article 2.2 above.
- G. Pipe Guards: Bolt to wall or column with expansion anchors, using four $\frac{3}{4}$ " anchors per guard, unless noted otherwise. Mount with top edge 26" above driving surface.

3.3 CLEANING AND FIELD TOUCHUP

- A. Following erection, thoroughly clean all steel work of all mud and dirt accumulated during erection.
- B. For shop-primed finishes, prepare and prime paint all welds, unpainted and abraded areas.
- C. For galvanized finishes, touch up with Cold-Galvanizing Compound by ZRC Products Co.
- D. Leave ready for finish painting per Section 099100.

END OF SECTION

SECTION 057000

ORNAMENTAL METALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Stainless steel handrails
- B. Stainless steel guardrail with aluminum top rail.
- C. Stainless steel bollards.
- D. All accessories, attachment, anchors, and rough hardware for ornamental metal work.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete.
- B. Section 055000 – Metal Fabrications.
- C. Section 071400 – Fluid Applied Waterproofing
- D. Section 044302 – Granite
- E. Section 321440 – Granite Unit Paving

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design handrails and guardrails, including comprehensive engineering analysis, by a professional engineer, registered in the State of Ohio, in accordance with the performance requirements and design criteria indicated.
- B. Structural Performance:
 - 1. Guardrails: Conform to ASTM E 985 for design and engineering performance based on testing performed in accordance with ASTM E 894 and STM E 935.
 - 2. Handrails and Top Rails of Guardrails:
 - a. Uniform load of 50 lb/ft. applied in any direction.
 - b. Concentrated load of 200 lb. applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 3. Infill of Guardrails:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.

- b. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 degree Fahrenheit, ambient; 180 degree Fahrenheit, material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 REFERENCES

- A. The following codes and standards are hereby incorporated as part of the Project Specifications. Modifications in this Specification, when in conflict with the referenced codes and standards, shall take precedence over the referenced codes and standards.
 - 1. Ohio Building Code – 2017.
 - 2. American Institute of Steel Construction (AISC) 303-16: "Code of Standard Practice for Steel Buildings and Bridges".
 - 3. ANSI/AISC 360-16: "Specification for Structural Steel Buildings" and including the "Commentary on the Specification for Structural Steel Buildings".
 - 4. American Welding Society (AWS):
 - a. D1.1 Structural Welding Code - Steel
 - b. D1.2 Structural Welding Code – Aluminum
 - c. D1.6 Structural Welding Code – Stainless Steel.

1.5 SUBMITTALS

- A. Shop drawings indicating fabrication, assembly and erection detail, member sizes, fastenings, supports and anchors, clearances, coating, and all necessary connections to adjacent work. Shop drawings shall bear the stamp of a Professional Engineer registered in the State of Ohio, who performed design calculations for members and connections.
- B. Setting drawings, templates, and directions for installation of anchorage items.
- C. Manufacturer's product data for proprietary products specified herein
- D. For expansion bolts, submit manufacturer's certificate of performance.
- E. Samples of assembled railing systems, made from full-size components including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.

1.5 QUALITY ASSURANCE

- A. All welds, welding operators, tackers and inspectors shall be fully qualified in accordance with the requirements of the American Welding Society for the type of work they are to perform.

1.6 MOCKUP:

- A. Guardrail: Full-height mockup with stanchions, top rail, infill rods, base plates and anchors. Mockup shall include each stanchion type; intermediate post, end-post, corner post. Each top rail detail to be included, including end cap, splice, and mitered corners.
- B. Handrails: Full-height, full-length section of handrail. Mockup to include proposed connections, posts, rails, and accommodation of other trades.
- C. Mockups will be reviewed by the Owner and Architect. Accepted mockup sections will be the standard for the entire project, and shall remain undisturbed until Substantial Completion. Mockups not accepted shall be removed and another mockup installed at no additional cost to the Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Material Storage: Protect miscellaneous metal and packaged materials from corrosion and deterioration. Store off ground and pitched to drain off water.
- B. Do not store materials on the structure in a manner that might cause distortion or damage to the members or the supporting structures. Repair or replace damaged materials or structures as directed.

1.8 PROJECT CONDITIONS

- A. Field measure as required for work fabricated to fit job conditions. Allow for trimming and fitting wherever fabrication might delay work.
- B. Determine correct detailing and design to anticipate deflection and curing of concrete and masonry structures to be attached.

1.9 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A167.

1. Tubing: ASTM A554, Grade 316L.
2. Pipe: ASTM A312, Grade 316L.
3. Castings: ASTM A743, Grade CF 8 or CF 3.
4. Plate, Flat Bar, and Sheet: ASTM A666, Type 316L.
5. Shapes: ASTM A276, Type 316L.
6. Fasteners: Type 316 stainless steel.
7. Welding Rod and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
8. Guardrail Infill Rods: TriPyramid medium strength stainless rod, ¼ inch diameter, #A03-0250, with adjustable turnbuckle and adjustable nipple, manufactured by TriPyramid Structures, Inc., or approved equal.

B. Aluminum:

1. Provide alloy and temper recommended by the aluminum producer and finisher for type of use, exposure, specified finish, and strength properties, but not less than the alloy and temper designations below.
2. Extruded Bars and Shapes: ASTM B221, Alloy 6063-T5/T52, yield strength of 15 KSI to 16 KSI.
3. Drawn Seamless Tubing: ASTM B210 or ASTM B483, Alloy 6063-TY832.
4. Plate and Sheet: ASTM B209, Alloy 6061-T6.
5. Fasteners: Tamper resistant, alloy and temper as recommended by the aluminum producer and finisher for type of use and finish indicated.

C. Grout Under Steel Bearing Plates: Pre-mixed, factory-packaged, nonmetallic, non-shrink, non-staining, noncorrosive, nongaseous grout complying with CRD-621 and ASTM C1107. Provide grout specifically recommended by manufacturer for exterior applications.

2.2 FABRICATION

A. General:

1. Fabricate items in accordance with this Specification, referenced codes and

standards, Drawings and final shop drawings.

2. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
3. Coordinate with the work of other trades to ensure proper interface with other work.

B. Connections:

1. Welded joints:
 - a. Cope components at connections to provide close fit, or use fittings designed for this purpose. Continuously weld or spot weld as specified. Dress face of welds flush and smooth.
 - b. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - c. Obtain fusion without undercut or overlap.
 - d. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
2. Make jointing where least conspicuous.
3. All accessories to be stainless steel.
4. Cutting and drilling: Carefully execute all necessary cutting, drilling, tapping, and fitting. Fit work at job before finishing.
5. Riveting, bolting, screwing:
 - a. Use flat countersunk heads in exposed faces of work.
 - b. Cut off bolts, screws, etc., where exposed, flush with nuts or other adjacent metal.
 - c. Weld or rivet shop-assembled connections.
 - d. Rivet, bolt, or machine-screw field connections.
 - e. Exposed fastenings: Same material, color, and finish as metal to which they apply.
 - f. Make up threaded connections tightly so that threads will be entirely concealed by fitting.

C. Railings:

1. Assemble in the shop to greatest extent possible to minimize field splicing and

assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

2. Guardrail and handrail stanchions to be custom fabricated and shop welded to base plates. Refer to drawings for rail details.
3. Form changes in direction of members as detailed.
3. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required. Maintain profile of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of railing components.
4. Provide wall brackets, flanges, miscellaneous fittings, and anchors as indicated to connect railing members to other work.
5. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices to withstand loads imposed by railings. Coordinate anchorage devices with supporting structure.
6. Shear punch metal cleanly and accurately. Remove burrs from exposed cut edges.
7. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the work.
8. Cut, reinforce, drill, and tap components as indicated, to receive finish hardware, screws, and similar items.
9. Close exposed ends of railing members with prefabricated end fitting or welded end cap.
10. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns.

D. Stainless Steel Finish:

1. Typical finish: Brushed Satin #4.
2. Remove or blend tool and die marks and stretch lines, or blend into finish.
3. Grind and polish surfaces to produce uniform, directional, textured finish indicated, free of cross scratches. Run grain of directionally textured finishes with long dimension of each piece.
4. When polishing is complete, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

E. Aluminum Finish:

1. Class I Clear Anodized Finish: AA-M32C22A41, medium satin directional

textured mechanical finish; chemical etch, medium matte, 0.7 mil minimum clear anodic coating.

PART 3 EXECUTION

3.1 PREPARATION

- A. Examine the areas and conditions under which work is to be installed. Notify the Construction Manager and Architect in writing of conditions detrimental to the proper and timely completion of the work.

- 1. Do not proceed with the work until satisfactory conditions have been corrected.

- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication.

3.2 INSTALLATION

- A. Install work in conformance with approved shop drawings and manufacturer's recommendations.

- B. Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

- C. Install supporting members, fastenings, hangers, bracing, brackets, straps, bolts, angles, and other required accessories to set work. Except where otherwise specified for particular items or for built-in work, secure to masonry with expansion or toggle bolts.

- D. Railings

- 1. General:

- a. Install in compliance with approved shop drawings, and requirements of Ohio Building Code.
 - b. Fit exposed connections together to form tight hairline joints.
 - c. Perform cutting, drilling, and fitting required for installation.
 - d. Set railings accurately in location, alignment, and elevation; measured from established lines and levels, and free of rack.
 - e. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - f. Set posts plumb within a tolerance of 1/16" in 3 feet.
 - g. Align rails so variations from level for horizontal members and variations

from parallel with rake of steps and ramps for sloping members do not exceed ¼" in 12 feet.

- h. Adjust railings before anchoring to ensure matching proper alignment.
- 2. Non-welded connections:
 - a. Use mechanical tamper resistant fasteners for permanently connecting railing components.
 - b. Use wood blocks and padding to prevent damage to railing members and fittings.
 - c. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- 3. Welded connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in Article 2.2.B above.
- 4. Expansion joints:
 - a. Install at locations indicated but not farther apart than required to accommodate thermal movement.
 - b. Provide slip-joint internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side, and locate joint within 6" of post.

3.3 TOLERANCES

- A. Variation from true plumb: +/- 1/8 inch in 20.0 feet.
- B. Variation from level: +/- 1/8 inch in 20.0 feet.
- C. Variation from true line: +/- 1/8 inch in 20.0 feet.

3.4 INSPECTION AND ACCEPTANCE

- A. Ornamental work will be rejected for any of the following deficiencies:
 - 1. Finish of exposed-to-view aluminum and stainless steel surfaces with color and appearance outside the range of the approved samples.
 - 2. Ornamental metal items that are stained, discolored, abraded, or otherwise damaged that cannot be removed by cleaning.
 - 3. Metal materials found in contact with dissimilar materials without protection.

3.5 CLEANING AND FIELD TOUCHUP

- A. Following erection, thoroughly clean all steel work of all mud and dirt accumulated during erection.

END OF SECTION

SECTION 071400
FLUID APPLIED WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Hot-applied waterproofing system.

1.2 RELATED SECTIONS

- A. Section 030100 - Concrete Repair.
- B. Section 079000 - Expansion Joints.
- C. Section 079200 – Sealants.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D-1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 2. ASTM D-4491: Standard Test Method for Water Permeability of Geotextiles by Permittivity.
 - 3. ASTM D-4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 4. ASTM D-4716: Standard Test Method for Determining the (in-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of Geosynthetic Using a Constant Head.
 - 5. ASTM D-4751: Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - 6. ASTM D-4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

1.4 DEFINITIONS

- A. The term "manufacturer's recommendations," or variations thereon shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."
- B. The term "membrane" or variations thereon used in the waterproofing documents shall mean "the entire hot fluid-applied waterproofing system" which includes components listed in this Specification Section and detailed in the Construction Documents.

- C. The term “provide” means furnish and install, complete and ready for intended use, as applicable in each instance.

1.5 SUBMITTALS

- A. Literature for manufactured products, including manufacturer's specifications, test data, installation instructions and applicator's manual.
- B. Letter of applicator approval from the manufacturer per Paragraph 1.6.B.
- C. Letters of experience per Paragraph 1.6.C.
- D. Letter from manufacturer stating their system as specified is suitable for use in this project.
- E. Material Safety Data Sheets on all materials.
- F. Upon completion of the work and before final payment provide fully executed warranties.
- G. Materials and procedures to be used in the repair of the existing waterproofing membrane and expansion joint flashing.

1.6 QUALITY ASSURANCE

- A. Applicable Codes:
 - 1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.
 - 2. If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.
- B. The membrane system applicator shall be approved by the manufacturer prior to the start of work.
- C. Membrane applicator's lead personnel (field superintendent and foreman) in charge of the work shall each have the following experience:
 - 1. Three (3) verifiable years of experience supervising the application of the membrane system being provided on this project.

2. Successfully installed three (3) membrane projects of similar size, type and using the same membrane system being provided on this project.
- D. Membrane applicator's lead personnel shall be present for all field operation pertaining to this waterproofing system installation.
- E. The Owner reserves the right to request different lead personnel if, in the Owner's opinion, those assigned to the project are not qualified by way of experience or ability to perform the Work. Comply with the Owner's request at no additional cost.
- F. Substrate Compatibility:
 1. The manufacturer and contractor shall:
 - a. Jointly review and inspect the substrate materials to which the new waterproofing membrane is intended to be applied.
 - b. Perform tests as necessary to ensure compatibility and verify the absence of materials - visible and invisible - detrimental to the application or performance of the waterproofing membrane.
 - c. Review materials specified elsewhere in the Construction Documents to which the waterproofing membrane is intended to be applied.
 2. If inspections, tests or review of materials and substrate reveal conflicts of compatibility with the intended waterproofing membrane provide written evidence of the compatibility conflict to the Owner prior to ordering of materials.
 3. By beginning the waterproofing system (including substrate preparation), the Contractor accepts the responsibility for ensuring the performance of the waterproofing system.
 4. If the Contractor fails to submit proof of incompatible materials, and if failure of the waterproofing system is a result of chemical or physical incompatibilities with existing or specified products or materials, the Contractor is responsible for all costs related to correcting the deficient work and for all direct and indirect costs to the Owner.
- G. Single Source – All waterproofing system components should be supplied from single-source manufacture.
- H. Testing:
 1. The Owner may perform tests to ensure compliance with the Contract Documents and manufacturer's requirements.
 2. If tests reveal noncompliance, correct deficiencies in a manner approved by the Owner and the manufacturer at no additional cost.
 3. Except as otherwise specified, the Owner will pay the cost of the tests, including

repair and patching of test areas.

4. Where tests reveal deficiencies in the membrane materials or installation, the costs of the tests, and repair and patching of the test areas shall be borne by the Contractor.

- I. Air compressors shall be equipped with functional oil and water separators.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in sealed, undamaged containers. Identify each container with the material's name, lot number and date of manufacture.
- B. Store membrane materials in a place specifically assigned for that purpose and which is well ventilated, lighted and not subject to direct sunlight.
- C. Heat or cool the storage area to maintain temperatures within the range recommended by the membrane manufacturer.
- D. Keep membrane materials sealed in original containers when not in use.
- E. Keep storage area neat and clean.
- F. Do not overload or otherwise distress the structure.
- G. Handle membrane system materials in strict accordance with safety and weather limitations required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.
- H. When using toxic or flammable solvents, take necessary precautions as recommended by the manufacturer. The handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.8 JOB CONDITIONS – WEIGHT RESTRICTIONS AND MOVEMENT

- A. The Contractor shall use equipment for membrane installation on structured concrete slab areas with the following weight restrictions:
 1. The maximum wheel load shall not exceed 2,000 lbs.
 2. The maximum distributed load shall not exceed 90 psf.
 3. Wheelbase of loaded equipment shall not exceed 5 feet.
 4. Equipment positioning, movement and orientation is subject to Engineer and Owner review.

1.9 WARRANTY

- A. The completed installation shall be warranted by the manufacturer against defects of materials, and by the Contractor for defects in workmanship for a period of ten (10) years, beginning with the date of substantial completion for the Project.
- B. The warranty shall not require the signature of the Owner.

PART 2 PRODUCTS

2.1 MEMBRANE MATERIALS

- A. Hot applied reinforced waterproofing membrane, Continuously reinforced system of 215 dry mils total membrane thickness with coverage modifications to account for existing surface roughness. Membrane must be fertilizer compatible.
 - 1. Monolithic Membrane 6125 by Hydrotech, Inc. (basis of design).
 - 2. 790-11 by Henry Company.
 - 3. 250 Rubberized Asphalt Membrane by Barrett Company
- B. Primer: Required. Product as recommended by the waterproofing membrane manufacturer.
- C. Flashing/reinforcing sheet: Spunbonded polyester fabric as recommended by the membrane manufacturer. Use uncured neoprene reinforcement sheet where required by the waterproofing manufacturer and at all membrane penetrations.
 - 1. Base of Design:
 - a. Flex – Flash UN by Hydrotech, Inc.
- D. Protection Course: Required. Product as recommended by the waterproofing membrane manufacturer.
 - 1. Plaza Protection Course:
 - a. Hydroflex 30 (basis of design).
 - 2. Tree Pit and Planting Area Protection Course:
 - a. Hydroflex RB II (basis of design) or
 - b. Hydroflex 30 & Root Barriers (basis of design / alternative to Hydroflex RB II).

E. Drainage Board:

1. Profile – Dimple board with high impact polystyrene core and woven filter fabric bonded to individual dimples.
 1. Base of Design:
 - a. Hydrodrain 990
2. Board Thickness – 0.25 to 0.38 inches.
3. Board Compressive Strength – Minimum 30,000 psf.
4. Board Flow Rate – 21 gallons/min./sq.ft at 3600 psf and hydraulic gradient 1.0 per ASTM D-4716.
5. Fabric opening size – US standard sieve 80 per ASTM D-4751.
6. Fabric Tensile Strength – 205 lbs. per ASTM D-4632.
7. Fabric Flow Rate – 95 gallons/sq.ft. per ASTM D-4491.

F. Filter Fabric: Non - Woven drainage fabric with the following characteristics:

1. Weight – 6.5 oz/sq.yd.
2. Grab Strength – 400x250 per ASTM D-4632.
3. Puncture Strength – 80 lbs. per ASTM D-4833.
4. Equivalent Opening Size – 70-100 US Standard sieve per ASTM D-4751.
5. Water

G. Adhesives and Sealants: As recommended and approved by the membrane manufacturer.

H. Neoprene Flashing Sheet: Fabric reinforced, minimum 60 mil thick material as recommended by waterproofing membrane manufacturer.

I. Root Barriers:

1. 160 mil thick polyester reinforced, modified asphalt sheet with granular surface and root inhibiting additive. Root barrier must be rated for intensive and extensive planting conditions. Tensile strength to be >50 lbs. /in. (machine and cross direction at 73°F.). Root barrier may act as protection sheet if approved by membrane manufacturer in writing.
2. Water based liquid latex root inhibitor coating for application at all sheet lap edges of root barrier sheet.

- J. Adhesives and Sealants: As recommended and approved by the membrane manufacturer.
- K. Termination Bar: 1" wide stainless-steel termination bar. Bar to be pre-punched at 6" o.c. to receive ¼" diameter anchors.
- L. Anchors for Termination bar: ¼" diameter x 1¼" lg. low profile mushroom head nail-in anchor consisting of a stainless-steel drive pin and aluminum/zinc alloy expanding metal body.

2.2 SEALANT

As specified in Section 07 92 00 JOINT SEALANTS.

2.3 SEALANT PRIMER

As specified in Section 07 92 00 JOINT SEALANTS.

2.4 BACKING MATERIAL

Remolded, closed-cell, polyethylene, or polyurethane foam rod having a diameter 25 percent larger than joint width before being compressed into joint. Provide bond breaker of polyethylene film or other suitable material between backing material and sealant.

PART 3 EXECUTION

3.1 PROTECTION

- A. Do not allow construction equipment or other trades on prepared concrete substrate or existing waterproofing system.
- B. Do not store materials or equipment on prepared concrete substrate or existing waterproofing system.
- C. Do not allow construction traffic personnel to traverse across prepared concrete substrate or existing waterproofing system.

3.2 PREPARATION

- A. General:
 - 1. Perform surface preparation and cleaning procedures in accordance with this Section unless the waterproofing system manufacturer has more stringent requirements. Apply membrane to clean, dry, prepared surfaces.
 - 2. Patch or detail voids and other surface defects as required providing a uniform, smooth substrate for the membrane application. Follow the membrane manufacturer's written recommendations.

3. Clean substrate surfaces to the standard of cleanliness required by the membrane manufacturer.
4. Clean substrate surfaces free of oil, grease, loose concrete, dirt, and any other debris that will inhibit bond or be detrimental to the system. Leave the prepared surface with a uniform texture and no more than 1% of the total surface area in noncompliance.
5. Do not use acids for surface preparation.
6. Do not use water (high pressure or low pressure) for surface preparation.

B. New Concrete:

1. Do not prepare substrate surfaces until the new concrete has reached adequate cure. Verify in writing the acceptable cure time from the membrane manufacturer.
2. Immediately prior to waterproofing installation, mechanically sweep and blush surfaces to loosen laitance and debris. Blow clean with oil-water free compressed air.

C. Existing Concrete:

1. Hand scrape to remove all remaining remnants of the previous waterproofing membrane not removed during demolition.
2. Shotblast with vacuum process or grind and vacuum surfaces to remove previous membrane residue from the concrete surfaces.
3. Immediately prior to waterproofing installation, clean surfaces to remove laitance and debris per manufacturer's requirements.

D. Metals:

1. Sandblast metal surfaces that will be in contact with membrane system.

3.3 APPLICATION OF NEW MEMBRANE SYSTEM

A. General:

1. Provide a total membrane system which the manufacturer recommends for this project. This Section specifies the minimum membrane mil thickness and system installation specifics required for the work.
2. Heat and apply the membrane in accordance with the manufacturer's instructions. Use materials and application techniques to prevent pinholing and blistering.
3. Terminate membrane on vertical surfaces 1/2" below the top of finish surfaces or grade which will be installed after the work of this Section.

4. Mask vertical surfaces as required to protect the adjacent surface finishes. Use temporary steel sleeves to protect newly installed reinforcing dowels, rods and tree tie-down eyelets during membrane installation.
5. Provide surface condition or primers on substrate as required by the membrane manufacturer.
6. Ensure specified application rates of liquid products on vertical and steeply sloped surfaces by using multiple applications of material over previous applications which are fully cured.

B. Detailing/Flashing

1. All detailing and flashing shall be done in accordance with the manufacturer's standard guideline details.
2. All detailing and flashing shall be completed before installing the membrane over the field of the substrate.
3. Roof substrate board joints shall be pre-detailed with membrane and fabric reinforcing prior to full fabric reinforced membrane application.
4. All liquid-applied, resin flashings shall be applied over properly completed membrane flashing details in accordance with the manufacturer's standard guideline details.

C. Reinforced Membrane Waterproofing:

1. In general floor areas, provide a minimum 90 dry mil membrane detail coat and continuous reinforcement sheet as required by the membrane manufacturer.
2. Provide a minimum 90 dry mil membrane detail coat and reinforcement sheet at interior and exterior corners and other changes in the substrate direction.
3. Provide a minimum 90 dry mil membrane detail coat and reinforcement sheet on all unit masonry walls, continuous with detail coat at adjacent wall to floor intersections.
4. Provide a minimum 90 dry mil membrane coat and uncured neoprene flashing sheet around drains and other slab penetrations at interior corners where slabs meet perimeter retaining walls, and at metal angles at expansion joints.
5. While membrane is hot, install reinforcing fabric and completely embed into liquid membrane.
6. Provide a minimum 125 dry mils second coating of membrane, for a total reinforced membrane thickness including the detailing of 215 dry mils. Modify coverage to account for existing surface roughness.
7. Otherwise refer to requirements of paragraph 3.3.A.

D. Protection Course:

1. Soon as possible following second coating of membrane, provide protection board on the membrane in compliance with the membrane manufacturer's recommendations.
2. Install no piece less than ten (10) square feet in size.
3. Ensure the protection board lays flat and in contact with the membrane.

E. Drainage Board:

1. Provide drainage board on all surfaces, including vertical surfaces, as indicated.
2. Begin installation at low point of deck area and proceed to high point. Panels shall be butted tightly.
3. Overlap drainage fabric in shingle fashion between abutting panels. Minimum overlap of fabric onto adjoining panel shall be 2".
4. Seal fabric overlap to abutting panel fabric with mastic as approved by the drainage board manufacturer. Install a minimum 1/4" wide continuous bead of mastic between overlap areas.
5. Where drainage board terminates at walls or other projections, wrap filter fabric over exposed edge and terminate on underside of board. Extend filter fabric a minimum of 1-1/2 inches onto underside of board.
6. Temporarily weight drainage board to maintain in place until next phase of work. Size and type of weight provided shall not damage previously complete waterproofing work or drainage board.
7. Cover drainage board promptly with next phase of work. Do not allow drainage board to be exposed for more than seven days. If drainage board is scheduled for exposure beyond seven days, install a supplemental layer of filter fabric to protect against excessive dirt and debris buildup as well as UV exposure. Remove and discard filter fabric prior to the installation of permanent overburden materials.

F. Root Barriers

1. Provide root barriers on the membrane in compliance with the membrane manufacturer's recommendations.

3.4 FIELD QUALITY CONTROL

A. Site Tests:

1. Water test:

- a. Prior to installation of drainage board, water test membrane by ponding a minimum of 2 inches for a period of 24 hours to ensure a watertight system.
- b. At sloped areas of greater than 2% or ramp areas, maintain a curtain of water flowing continuously over the area for a period of 48 hours.
- c. Provide means of water containment during water testing to prevent flooding of adjoining areas and areas below the plaza.
- d. Verify that the structure can support the dead load weight of the water prior to testing.
- e. If leaks occur, drain area and repair membrane. Retest.
- f. Construct water containment barriers as approved by the membrane manufacturer.
- g. Water tests can be waived jointly by the Owner and the Manufacturer, only after the Contractor has demonstrated the ability to provide successful system installation in previous application areas.

2. Application monitoring:

- a. Keep at the site and maintain in proper condition an adequate number (at least one per application crew) of durable, wet film thickness gauges.
- b. Continuously use gauges during the application process to ensure the specified thickness.
- c. Owner will periodically monitor the application rates of the membrane components and will notify the job foreman of noted discrepancies.
- d. Owner's periodic monitoring of the application rates shall not relieve the Contractor of the responsibility to provide the specified membrane thickness.

B. Manufacturer's Field Service:

1. A technically competent employee of the waterproofing membrane manufacturer (the technician), not associated with the Contractor, the installation crew, product distributor or sales representative shall be on site before the first installation of the membrane system. Provide resume of experience and credentials for approval by the Owner.

2. The technician shall remain on site for the length of time necessary to observe the preparation and installation of 50% of the waterproofing membrane system (including drainage board).
3. Do not begin application of the waterproofing membrane system until the technician has approved the preparation, cleanliness and surface texture of the substrate.
4. The technician shall review all Contractor application techniques and procedures and shall advise the Contractor when, where and as required to obtain specification compliance.
5. Owner reserves the right to request the presence of the same technician on site for installation of the remainder of the waterproofing membrane system or related work if difficulties are encountered, as determined by the Owner, at no additional cost to the Owner.
6. Owner reserves the right to request a different technician if the one at the site fails to perform the duties herein specified. The Contractor and manufacturer shall comply with the Owner's request at no additional cost to the Owner.

3.5 CLEAN-UP

- A. During the progress of the work, remove from the project all discarded materials and debris.
- B. Clean all surfaces affected by work of this Section and repair all damage caused to adjacent construction or property, at no cost to the Owner.
- C. Leave adjacent premises clean and free of construction dirt and debris which resulted as part of the construction process.
- D. Remove empty containers from the facility at the end of each working day.
- E. Place soiled cloths that constitute fire hazards in suitable metal safety containers or remove them from the site at the end of each working day. Take special care in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

SECTION 079000
EXPANSION JOINTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wing Compression expansion joint seal installation.
- B. Compressible expansion joint seal installation.

1.2 RELATED SECTIONS

- A. Section 030100 - Concrete Repairs.
- B. Section 071400 – Fluid Applied Waterproofing.
- C. Section 079200 – Sealants.

1.3 SUBMITTALS

- A. Joint and Several Warranty Form meeting the requirements of Paragraph 1.7.
- B. Letter of inspection approving blockout or noting unacceptable conditions per Paragraph 1.4F.
- C. Shop drawings of all expansion joint conditions, including typical section, factory manufactured splices and each termination detail.
- D. Literature for manufactured products, including manufacturer's specifications, test data and installation instructions including temperature limitations and joint opening recommendations.
- E. Letter of approval per Paragraph 1.4.B.
- F. Prior project experience per Paragraph 1.4.C.
- G. Joint System Sample per Paragraph 1.4.E.
- H. Name and resume of persons per Paragraphs 1.4.D and 1.4.F.
- I. Letter from expansion joint manufacturer per Paragraph 1.6.

1.4 QUALITY ASSURANCE

- A. Applicable Codes:
 - 1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also

with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with this Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

2. If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.
- B. The expansion joint installer shall be approved by the manufacturer.
 - C. All work under this Section shall be performed by Contractors which have successfully performed at least three verifiable years of projects that are similar in magnitude and type to those involved in this Contract and three or more prior projects in a climate similar to that for this project.
 - D. All work under this Section shall be under the immediate control of the Contractor's non-working superintendent(s) experienced in this type of work. The person(s) shall have supervised three prior projects of similar magnitude and type and shall be present during all operations. This person(s) shall be approved by the Owner.
 - E. The Owner may submit material samples to an independent testing laboratory for verification of material properties and/or conformance to performance standards.
 - F. A technically competent employee of the expansion joint manufacturer (not associated with the installation crew or Contractor) shall be present before and during the installation of the initial lengths of the joint system (minimum 50% of total joints) on this project. This person shall be approved by the Owner.
 - G. The expansion joint manufacturer and installer must inspect the completed block-outs prior to the start of new joint system installation. Unacceptable conditions must be reported, in writing, to the Owner prior to start of work. Starting installation of the new expansion joints constitutes acceptance of the completed block-out conditions.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to job site in sealed, undamaged containers. Each container shall be identified with materials' name, date of manufacture, lot and batch number.
- B. Store materials when not in actual use in a place specifically assigned for that purpose which is well ventilated and lighted and not subject to direct sun rays. Materials shall be kept or packaged when not in use. Keep storage area neat and clean and secure from vandalism and theft.

- C. Perform work in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.
- D. When toxic or flammable solvents are used, the seal installer shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.6 SEQUENCING

- A. The expansion joint seal manufacturer shall provide a written procedure for installation of new expansion joint seals within 10 days after placement of cementitious material used for the modification of expansion joint block-outs and overlays.

1.7 WARRANTY

- A. A warranty of five years shall be provided for all types of new expansion joint seals. The manufacturer and approved installer shall jointly and severally maintain the joint in a safe, waterproof condition for the warranty period at no additional cost to the Owner. The Contractor is responsible for compliance of both the manufacturer and approved installer for the warranty period.

PART 2 PRODUCTS

2.1 WINGED COMPRESSION SEAL EXPANSION JOINT SYSTEM:

- A. Thermafex Parking Deck EJ System by Emseal Joint Systems
 - 1. Seal size – TCR 400.
 - 2. Contractor to confirm size before ordering
- B. Iso-flex Winged EJ System by Lymtal International
 - 1. Seal size – J 40.
 - 2. Contractor to confirm size before ordering
- C. Wabocrete 201 Membrane System by Watson, Bowman, Acme/BASF
 - 1. Seal size – ME 400.
 - 2. Contractor to confirm size before ordering

2.2 COMPRESSIBLE EXPANSION JOINT SEAL – TYPE A SYSTEM

- A. DSM seal by Emseal, Inc.
 - 1. Seal size – 1”
 - 2. Contractor to confirm size before ordering.
- B. Willseal 250 by Willseal, Inc.
 - 1. Joint size – 1”.
 - 2. Contractor to confirm size before ordering.

PART 3 EXECUTIONS

3.1 GENERAL

- A. Where scheduled for replacement, remove existing expansion joint systems and perform minor concrete repairs as required to perform the work. Refer to Drawings and Section 030100 as appropriate.
- B. If found, remove styrofoam or any other form of joint filler material in expansion joint openings.
- C. Cure all expansion joint system nosing and adhesive materials in accordance with manufacturer's recommendations. Allow nosing to cure for minimum time period based on temperature conditions required by the manufacturer. Verify nosing and adhesive material is cured, prior to allowing vehicular traffic across the joint. Use traffic plates if necessary, temporarily anchor to the deck side of the joint, to accommodate traffic.
- D. Accelerated curing by heating of nosing and adhesive material is not permitted.
- E. Do not install seals or associated materials over or on wet substrate materials.
- F. Cease installation of seals under adverse weather conditions, or when temperatures (deck or ambient) are outside the allowable temperature limits.
- G. Install seals as soon during the Work as substrate temperatures permit.

3.2 NEW WINGED SEAL EXPANSION JOINT SYSTEM INSTALLATION

- A. Preparation of concrete joint openings:
 - 1. Where appropriate, perform all necessary repairs to establish consistent joint openings across the entire deck surface. Use manufacturers approved epoxy based repair materials for minor joint edge or block-out repairs, or alternative concrete repair materials for larger repair areas. Refer to Specification Section 030100.

2. Rout and seal adjacent construction joints or cracks that intersect the block-out for a length of 8 inches. Refer to Specification Section 079200.
3. Grind and vacuum clean all concrete surfaces to be in contact with seal system no sooner than 24 hours before seal installation. Contact surfaces shall be clean, dry and sound. Re-grinding is required if contact surfaces become contaminated after the initial blasting. This includes contamination by rainwater runoff. Wet sand blasting followed by adequate drying is approved if conditions warrant, as approved by manufacturer.
4. Coordinate preparation procedures to avoid damage to vehicles on levels below or adjacent to work area. Remove all dirt and debris from joint opening and adjacent floor areas on both levels immediately after work is complete.

B. Installation:

1. Install new seal per manufacturer's installation instructions. Perform work during coolest portion of day, typically in the middle of the night. Complete work at least 4 hours prior to anticipated rising deck temperatures. Cease installation of joint system under adverse weather conditions.
2. Splice seal material per manufacturer's instructions to form a continuous length. Do not splice seal in drive lane unless approved by the Engineer.
3. All transitions, turn-ups, corners and "T" joints shall be factory manufactured components shall be approved in advance by Engineer.
4. Seal elevation shall be installed flush or slightly recessed from nosing/header surface.
5. Cure materials in accordance with manufacturer's recommendations.

3.3 NEW COMPRESSIBLE EXPANSION JOINT SYSTEM INSTALLATION

A. Preparation of concrete joint openings:

1. Where appropriate, perform all necessary repairs to establish consistent joint openings across the entire deck surface. Use manufacturers approved epoxy based repair materials for minor joint edge or block-out repairs, or alternative concrete repair materials for larger repair areas. Refer to Specification Section 030100.
2. Rout and seal adjacent construction joints or cracks that intersect the block-out for a length of 8 inches. Refer to Specification Section 079200.

3. Grind and vacuum clean all concrete surfaces to be in contact with seal system no sooner than 24 hours before seal installation. Contact surfaces shall be clean, dry and sound. Re-grinding is required if contact surfaces become contaminated after the initial blasting. This includes contamination by rainwater runoff. Wet sand blasting followed by adequate drying is approved if conditions warrant, as approved by manufacturer.
4. Coordinate preparation procedures to avoid damage to vehicles on levels below or adjacent to work area. Remove all dirt and debris from joint opening and adjacent floor areas on both levels immediately after work is complete.

B. Seal Installation:

1. Install new seal per manufacturer's installation instructions. Perform work during coolest portion of day, typically in the middle of the night. Complete work at least 4 hours prior to anticipated rising deck temperatures. Cease installation of joint system under adverse weather conditions.
2. Install manufacturer's approved adhesive or bonder to compression seal and concrete, nosing or metal surfaces which will be in contact.
3. Install seals per manufacturer's installation instructions.
4. Install the seals in continuous lengths with no splices in the horizontal plane of the seal. Recess seals slightly from adjacent floor surfaces.
5. Turn seals up onto and across curbs and up 4 inches at adjoining vertical wall and column surfaces. Vertical installation to be flush with adjoining wall and column surfaces.
6. As appropriate, provide heat welds or adhesive at direction changes from horizontal to vertical. Execute welds per manufacturer's requirements.
7. Before installation, test splices with a 150# axial tension load.
8. Seal splices at end conditions as recommended by the manufacturer if those conditions are not shown on the Drawings.
9. Install any supplemental silicone cap seal materials in the same work shift, or no later than the next day if no inclement weather is predicted.

3.4 CLEAN-UP

- A. During the progress of the Work, remove from the project all discarded materials, rubbish, cans and rags.
- B. Clean all surfaces of drops or spills of nosing materials with manufacturer approved solvents which are not deleterious to the concrete surface.
- C. All hardware, adjacent floor areas, metal work, etc., and the premises shall be left

clean and free of all construction dirt and debris. This includes the removal of debris from pipes, etc., which resulted as part of the construction process.

- D. Empty containers shall be removed from the building at the end of each working day. All cloths soiled with solvent or other materials that might constitute a fire hazard shall be placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

SECTION 079200

SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Miscellaneous sealants as noted on the Project Drawing Set.

1.2 RELATED SECTIONS

- A. Section 071400 – Fluid Applied Waterproofing.
- B. Section 079000 – Expansion Joints.

1.3 DEFINITIONS

- A. Where the term "manufacturer's recommendations," or variations thereon, are found in this Specification, it shall mean "manufacturer's recommendations which are found in publications available to and commonly used by the general architectural and consulting professions."

1.4 SUBMITTALS

- A. Copies of literature for all manufactured products, including manufacturer's specifications, test data and installation instructions or applicator's manual.
- B. Letter per Paragraph 1.5.B.
- C. Resume of contractor superintendent or employee per Paragraph 1.5.D.
- D. Manufacturer's certification per Paragraphs 1.5.F.
- E. Proof samples of sealants intended to be installed per Paragraph 1.5.G.
- F. If requested, Field samples of sealants installed on site per Paragraph 1.5.H.
- G. Material Safety Data Sheets on all materials which are classified as hazardous materials.
- H. Upon completion of the Work and prior to final payment, provide written recommendations for routine care and maintenance. Provide list of three Contractors nearest the project location who are qualified to perform repairs to the sealants. Identify common causes of damage and include instructions for temporary patching until permanent repair can be made by qualified personnel.
- I. Upon completion of the Work and prior to final payment, provide a fully executed warranty.

1.5 QUALITY ASSURANCE

A. Applicable Codes:

1. The Contractor shall comply with all Federal, State and Municipal laws, codes, ordinances and regulations applicable to the Work in this Contract and also with all requirements of the National Fire Protection Association, the National Electric Code, and the Occupational Safety and Health Administration (OSHA). If the above laws, codes or ordinances conflict with the Specification, then the laws, codes or ordinances shall govern, except in such cases where the Specification exceeds them in quality of materials or labor, then the Specifications shall be followed.

- B. The sealant installer must be acceptable to the manufacturer. Provide written confirmation that the intended sealant installer is acceptable to the manufacturer.
- C. The Contractor shall review locations where joint sealant work is specified, and shall submit in writing existing conditions and newly specified details which would cause sealant material to fail. Failure to review existing conditions or identify details or procedures which will cause failure of sealant material to perform as specified, the Contractor shall become responsible for all costs relating to correcting the deficient work, including all direct and indirect costs to the Owner.
- D. The Contractor's superintendent, or another technically competent employee of the Contractor approved by the Owner and Manufacturer, shall be on site and supervise installation of all sealant on this project. Sealant identified as being installed not under the direct supervision of this person shall be subject to removal and replacement, at the direction of the Owner. This person identified for supervision of the work shall have supervised at least three prior projects of similar magnitude and type.
- E. The Owner may, at his discretion, choose to remove up to a six-inch length of sealant in locations at a time after installation and initial curing of sealant to verify installation as specified. The Contractor shall include in his Bid the costs to repair one such location for each 100 ft. of sealant installation. If inspections of these locations by the Owner reveal deficient installation of sealant, the Owner may remove additional sealant to further quantify the length of deficient sealant. The Contractor shall repair all deficient locations of sealant found by the Owner at no additional cost and no extension of time for the work.
- F. Sealant materials shall be certified to be compatible by the manufacturer for use with the membrane system.
- G. Proof Samples of all sealant materials used on the job site shall be prepared in advance of the work by the Contractor and submitted to the Owner for purposes of testing and examination. Samples shall be manufactured with a unit of material from the first batch intended for use on the project. Samples (4 total) shall be at least 2 inch x 2 inch square and 1/2 inch thick, with troweled top surfaces,

identified with manufacturer's batch numbers, date and location of preparation.

- H. The Owner may, at his discretion, direct the Contractor to prepare and submit Field Samples of sealant materials used on the job site during the work. Samples shall be manufactured on site, from a unit of material from the same batch in use that day. Samples (2 total) shall be at least 2 inch x 2 inch square and 1/2 inch thick, with troweled top surfaces, identified with manufacturer's batch numbers, date and location on the project where the sealants represented in the samples were installed. Up to three sets of Field Samples may be requested on this project in the Base Bid.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in sealed, undamaged containers. Each container shall be identified with material's name, date of manufacture and lot number.
- B. Only those materials being used during any one work shift may be stored in the Work area. Coordinate location of storage area with the Owner.
- C. Sealant materials shall be kept sealed when not in use.
- D. Storage and handling of materials shall conform to the requirements of the applicable safety regulatory agencies.
- E. Storage areas shall be heated or cooled as required for maintaining the product temperatures within the range recommended by the manufacturer.

1.7 PROJECT CONDITIONS

- A. Install sealant materials in strict accordance with all safety and weather conditions required by product literature or as modified by applicable rules and regulations of Local, State and Federal authorities having jurisdiction.
- B. Fumes and debris shall be controlled to prevent harmful or undesirable effects in surrounding areas.
- C. When toxic or flammable solvents are used, the Contractor shall take all necessary precautions as recommended by the manufacturer. In all cases, the handling and use of toxic or flammable solvents, including adequate ventilation and personal protective equipment, shall conform to the requirements of the applicable safety regulatory agencies.

1.8 SEQUENCING

- A. Install sealants after any required concrete repairs.
- B. Install sealants after adequate cure of concrete repairs. Confirm required cure time with sealant manufacturer.
- C. Install all sealants prior to installation of membrane systems.

1.9 WARRANTY

- A. New sealant work shall be warranted for a period of five (5) years against defects due to installation or material deficiencies, including but not limited to excessive softness, excessive entrapped air in cured cross sections, disbonding, cohesive failure, leakage and ultra violet exposure degradation.
- B. In addition to the (5) year warranty the silicone manufacturer is to furnish a warranty of (15) years for all types of new sealant joints to the Owner. New sealant work shall be warranted against defects due to material failure, including but not limited to excessive softness, excessive entrapped air in cured material, disbonding, cohesive failure, leakage and ultra violet exposure degradation.
- C. All required testing and quality assurance operations necessary to furnish the warranty are Contractor and manufacturer's responsibility.

PART 2 PRODUCTS

2.1 CRACK AND JOINT SEALANTS

- A. Multi-component, unmodified, polyurethane. Approved products manufacturers include:
 - 1. Sika 2c NS-TG/SL by Sika Corp.
 - 2. Dymeric 240FC by Tremco, Inc.
- B. Minimum compression or extension of 25% of the nominal joint width without adhesive or cohesive failure.
- C. Primer(s) as recommended by sealant manufacturer for each substrate.
- D. Sealants in areas to be coated with membrane per Section 071800 shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.
- E. Cove sealants shall be gun grade (non-sag).
- F. Backer Rod or Bond Breaker Tape: Backer Rod shall be closed-cell, polyethylene in sizes to maintain 25 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approval for each intended application location is obtained from the Owner. Alternative use of bond breaker tape in size appropriate for the width of joint and approved for use by the sealant manufacturer will be allowed on a case-by-case basis.
- G. For joint edge repairs refer to Specification Section 030100.

2.2 SILICONE SEALANTS

- A. Approved for horizontal or vertical sealant installations. Products and manufacturers include:
 - 1. Dowsil 888 by Dow Corning, Inc.
 - 2. Spectrem 800 NS by Tremco Sealant Waterproofing Division.
- B. Minimum compression or extension of 50% of the nominal joint width without adhesive or adhesive failure.
- C. Primer(s) as recommended by the sealant manufacturer for each substrate.
- D. Sealants shall be gun grade (non-sag) unless otherwise noted on the Drawings or in this Section.
- E. Backer Rod. Backer Rod shall be closed-cell, polyethylene in sizes to maintain 50 percent compression. Backer rod shall not be used except where indicated on the Drawings or unless approved for each intended application location is obtained by the Owner.
- F. For joint edge repairs refer to Specification Section 030100.

PART 3 EXECUTIONS

3.1 GENERAL

- A. Remove existing sealants in joint cavities, coves and other locations and clean surfaces to remove residue. Rout any new joint cavities scheduled for new sealant. Grind and vacuum clean all joint cavities, coves and other locations scheduled for new sealant as required by the sealant manufacturer within 24 hours of sealant installation.
- B. Primer shall be used for all sealant installations regardless of manufacturer's requirements, unless a letter from the manufacturer states use of a primer is detrimental. Allow primer to cure per manufacturer's recommendation prior to sealant installation.
- C. Joint cavities that become contaminated by dirt or moisture after initial preparation, shall be cleaned again at no additional cost to the Owner.
- D. Modify the depth of existing joints by additional routing or positioning of backer rod to maintain a width to depth ratio of 2 to 1 unless otherwise noted on the drawings. At no location is the sealant width allowed to exceed 1-1/2".
- E. Where necessary, square up joint edges and execute repairs with epoxy repair mortar in accordance with manufacturer's recommendations.
- F. Rout cracks per details in surfaces at locations directed by the Owner.

- G. Rout joints per details.

3.2 NEW SEALANT

- A. Refer to Article 3.1 for joint cavity preparation requirements.
- B. Clean substrate surfaced and apply primer as recommended by the sealant manufacturer.
- C. Install backer rod or bond-breaker tape where required. Vary size of backer rod if necessary based on field conditions per Article 2.1.F or Article 2.2.F.
- D. Install sealant as indicated in details on the Drawings.

3.3 JOINT EDGE REPAIRS

- A. Identify joint edge spalls which are too large to be filled with new sealant. Review repair locations with Owner in advance of the work.
- B. Square edges of spall with diamond blade as indicated on Drawings.
- C. Clean cavity per Article 3.1.
- D. Mix epoxy and clean, dry sand to form grout material, and install per Specification Section 030100.
- E. Allow for cure prior to sealant installation.

3.4 MISCELLANEOUS SEALANTS

- A. Install miscellaneous sealants around drains, pipe penetrations in floors, and elsewhere. Install per Article 3.2 and as indicated on the Drawings.

3.5 CLEAN-UP

- A. During the progress of the Work, remove from the project all discarded coating materials, rubbish, cans and rags.
- B. All sealant material and drops shall be completely removed from hardware, adjacent floor areas, metal work, etc., and the premises shall be left clean and in orderly condition.
- C. All hardware, adjacent floor areas, metal work, etc., and the general premises shall be left clean and free of all construction dirt and debris. This includes removal of all debris from pipes, etc., which resulted from work specified herein.
- D. Repaint in matching color all curbs, columns, walls, etc., where existing paint was removed during preparation for sealant installation. Refer to Section 321723.
- E. Empty containers shall be removed from the garage at the end of each working day. All cloths soiled with coating that might constitute a fire hazard shall be

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP6-February 21, 2020
THP No. 98090.38

placed in suitable metal safety containers or shall be removed from the building at the end of each working day. Special care shall be taken in storage or disposal of flammable materials. Comply with health and fire regulations.

END OF SECTION

DIVISION 12 – FURNISHINGS

SECTION 129300

SITE FURNISHINGS

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. Backed benches.
2. Bench toppers.
3. Bicycle racks.
4. Litter receptacles.
5. Planters.
6. Drinking Fountains.

- B. Related Requirements:

1. Section 033000 "Cast-In-Place Concrete" for foundations for site furnishings.

1.3 REFERENCES

- A. ASTM Testing Standards:

1. ASTM A 53 – Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc Coated, Welded and Seamless.
2. ASTM A 123 – Specification for Zinc (hot-dip galvanized) Coatings on Iron and Steel Products.
3. ASTM B 117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.
4. ASTM D 522 – Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
5. ASTM D 523 – Standard Test Method for Specular Gloss.
6. ASTM D 2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
7. ASTM D 2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
8. ASTM D 3359 – Standard Test Methods for Measuring Adhesion by Tape Test.
9. ASTM D 3363 – Standard Test Method for Film Hardness by Pencil Test.
10. ASTM G 155 – Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials.

B. ISO Testing Standards:

1. ISO 1520 – Paints and Varnishes – Cupping Test.
2. ISO 2815 – Paints and Varnishes – Buchholz Indentation Test.

1.4 PERFORMANCE REQUIREMENTS

- A. Bollards must meet minimum level of K2.7 impact kinetic energy designation as identified by the ASTM Standard Test Method for Vehicle Crash Testing of Perimeter Barriers. Manufacturer must provide documentation confirming that a finite element analysis has been completed for this product. A K2.7 rating is equivalent to stopping a 5,500 lb. vehicle traveling at 40 mph.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Submit manufacturer's shop drawings, including plans and elevations, indicating overall dimensions.
- C. Samples for Verification: For each exposed product and for each color and texture specified.
- D. Product Schedule: For site furnishings. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For site furnishings.
- B. Warranty: Manufacturer's standard warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For site furnishings to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Trash Receptacle Inner Containers: one full-size unit for each size indicated.
 2. Anchors: Two units for each type indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area in accordance with manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until installation.

- C. Handling: Protect materials and finish during handling and installation to prevent damage.

1.10 WARRANTY

- A. Products will be free from defects in material and/or workmanship for a period of three years from the date of invoice.
- B. The warranty does not apply to damage resulting from accident, alteration, misuse, tampering, negligence, or abuse.
- C. Manufacturer shall, at its option, repair, replace, or refund the purchase price of any items found defective upon inspection by an authorized Landscape Forms service representative.
- D. Purchasers should be aware that normal use of these products can result in superficial damage affecting the finish. Scratches, nicks, and dents are to be considered normal wear and tear and are not the responsibility of the manufacturer.

PART 2 - PRODUCTS

2.1 BACKED BENCHES

- A. Manufacturer: Landscape Forms, Inc.; 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax : (269) 381-3455. Website: www.landscapeforms.com; E-mail: specify@landscapeforms.com.
- B. Model: Stay Bench.
- C. Style: Length: 68.5 inches.
 - 1. Backless.
 - 2. Divider option: Two dividers.
 - 3. Arm option: No arms.
- D. Mounting: Surface mounted with paver adapters as indicated on drawings.
- E. Materials:
 - 1. Supports: End supports are type 319 ASTM B 26 aluminum sand castings
 - 2. Frame: Front seat rail is 1.5" OD x .120" wall normalized 4130 welded steel tubing with type 304 ASTM A 276 stainless steel threaded inserts welded inside each end. Rear seat rail is 1.5" OD x .120" wall ASTM A 513 type 1 steel tubing. Seat panel connections are .250" x .75" x .80" type 304 ASTM A 276 stainless steel flat bar welded to rails. Upper and lower back rails are 6061-T6 or 6005A-T5 ASTM B 211 aluminum extrusions. Upper rail is 1.375" dia.; lower rail is .875" diameter.
 - 3. Seat and Back Panels: Seat panel is .120" thick ASTM A 1011 hot rolled pickled and oiled commercial steel type B perforated and formed. Seat panel connections are .188" x 1" x 1.5" type 304 ASTM A 276 stainless steel flat bar

- welded to panel. Back panel is .125" thick 3003-H14 ASTM B 209 aluminum sheet perforated and formed. Back panel is welded to back rails.
4. Surface Mount Hardware: Plates are .375" thick 6061-T6511 ASTM B 221 aluminum flat bar. Anchors are 3/8-16 internal thread adhesive grip concrete anchors, zinc-plated steel, with 3/8-16 x 1-3/8" long hex bolt with Magni-coat, and 3/8" washers with Magni-coat.
 5. Embedded anchor rod: 3/8"-16 x 5 1/8 type 304 stainless steel.
 6. Paver Adapters: Paver adapters allow surface mounting to underlying concrete slab. Adapters are 6061-T6 or 6005A-T5 ASTM B 211 aluminum extrusions 3.50" high x 4.50" wide. Adapter for backed bench is 8.52" long; adapter for backless bench is 4.25" long.
 7. Seat Dividers: Optional seat dividers are type 319 ASTM B 26 aluminum sand castings.
 8. Fasteners: All threaded fasteners are stainless steel or Magni 565 coated carbon steel. Seat dividers are attached with nylon shoulder and flat washers to protect the seat panel finish.
- F. Finish on Metal: Landscape Forms, Inc. "Pangard II".
1. Color: Silver, verify color with city.
- 2.2 BENCH TOPPERS
- A. Manufacturer: Landscape Forms, Inc.; 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax : (269) 381-3455. Website: www.landscapeforms.com; E-mail: specify@landscapeforms.com.
- B. Model: Parallel 42, modified.
1. Style: Straight, backless
 2. Length: 67 inches.
 3. Arm option: With two arms.
- C. Mounting: Surface mount to top of concrete seat wall as indicated on Drawings.
- D. Materials:
1. Seat: Bench consists of 1-3/8" x 1-1/4", 1-5/8" x 1-1/4" and 1-7/8" x 1-1/4". All boards have eased edges. Attached to plates/supports with stainless steel hardware.
 - a. Exterior Use: Ipe: Solid stock, select South American hardwood.
 2. Supports: Constructed of 10-gauge HRPO steel.
- E. Finishes:
1. Finishes on Metal: Landscape Forms, Inc. "Pangard II".
 - a. Color: Silver, verify color with city.

2. Finishes on Wood: Unfinished.

2.3 BICYCLE RACKS

- A. Manufacturer: Landscape Forms, Inc.; 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax : (269) 381-3455. Website: www.landscapeforms.com; E-mail: specify@landscapeforms.com.
- B. Model: Flo Bicycle Rack.
- C. Style: Outside diameter: 1.5 inches, 0.120 wall thickness.
 1. Embedded.
 2. 304 stainless steel.
- D. Materials:
 1. Embedded rods: 5/8-11 x 4" length stainless steel threaded rods with thread patch, included.
- E. Finish on Stainless Steel: #4 satin electropolish finish.

2.4 LITTER RECEPTACLE

- A. Manufacturer: Landscape Forms, Inc.; 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax : (269) 381-3455. Website: www.landscapeforms.com; E-mail: specify@landscapeforms.com.
- B. Model: Chase Park litter receptacle.
- C. Style: Side opening.
- D. Mounting: Surface mounted.
- E. Lock: Keyed with 2 brass keys.
 1. Coordinate with City to match existing keys.
- F. Materials:
 1. Base: Rotationally molded linear low-density polyethylene. Color is dark gray. Base is filled with concrete for stability.
 2. Sides and Door: Cast 319 aluminum.
 3. Hinges: Two, carbon steel with silver Magni-coat, connects sides and door.
 4. Latch: carbon steel with silver Magni-coat.
 5. Lock Cam, and Lock Plate: Type 304 Stainless steel.
 6. Lid: 0.100-inch thickness, spun 1100-0 aluminum.
 7. Lid Bracket: 1-inch by 1-inch by 1/4-inch aluminum angle.
 8. Liners: Black, formed polyethylene.
 - a. Single liner, side opening litter, 36-gallon capacity

9. Fasteners: Stainless steel.

G. Accessories

1. Anchor Bolts: Corrosion resistant recommended, not supplied by the manufacturer.

H. Finish on Metal: Landscape Forms, Inc. "Pangard II".

1. Color: Silver, verify color with city.

2.5 PLANTERS

- A. Manufacturer: Landscape Forms, Inc.; 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax : (269) 381-3455. Website: www.landscapeforms.com; E-mail: specify@landscapeforms.com.

B. Model: Sorella

C. Dimensions:

1. Square 30 inches by 30 inches.
2. Height: 18 inches.
3. Capacity: 55 Gallons.

D. Mounting: Freestanding.

E. Options: With (2) 1/2-inch diameter drain holes, drilled through interior base.

F. Materials:

1. Side Panels: Carbon steel ASTM A 1011 hot rolled pickled and oiled commercial steel type B, 14 gauge (.0747") formed. Seams are welded.
2. Corner Glides and Interior Base: Constructed of compression-molded recycled plastic resulting from an innovative, patented melting process that utilizes 100% post-consumer and post-industrial waste, attached to metal panels with black magni-coated carbon steel 1/4-10 Pan head torx drive screws.
3. Watertight Sealing Gasket: Constructed of black butyl tape, 3/8" wide.

G. Finish on Metal: Landscape Forms, Inc. "Pangard II".

1. Color: Silver, verify color with city.

2.6 DRINKING FOUNTAINS

- A. Manufacturer: Most Dependable Fountains, Inc.; 5705 Commander Drive, P.O. Box 587, Arlington, TN 38002-0587; Phone: (901) 867-0039; Fax: (901) 867-0159; Website: www.mostdependable.com.

B. Model: 440 SM.

C. Options:

1. Recessed hose bibb and lock door.
2. Attached pet fountain.

D. Finish: Manufacturer's standard powdercoat.

1. Color: Chrome.

2.7 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:

1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211.
2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221.
3. Structural Pipe and Tube: ASTM B 429/B 429M.
4. Sheet and Plate: ASTM B 209.
5. Castings: ASTM B 26/B 26M.

B. Steel and Iron: Free of surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53/A 53M, or electric-resistance-welded pipe complying with ASTM A 135/A 135M.
3. Tubing: Cold-formed steel tubing complying with ASTM A 500/A 500M.
4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513, or steel tubing fabricated from steel complying with ASTM A 1011/A 1011M and complying with dimensional tolerances in ASTM A 500/A 500M; zinc coated internally and externally.
5. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
6. Perforated Metal: From steel sheet not less than 0.090-inch nominal thickness; manufacturer's standard perforation pattern.
7. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F 1267.
8. Malleable-Iron Castings: ASTM A 47/A 47M, grade as recommended by fabricator for type of use intended.
9. Gray-Iron Castings: ASTM A 48/A 48M, Class 200.

C. Stainless Steel: Free of surface blemishes and complying with the following:

1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312M.
3. Tubing: ASTM A 554.

D. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant.

2.8 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended, so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- E. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.9 FINISHES

- A. General Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- B. Finish on Metal: Landscape Forms, Inc. "Pangard II".
 - 1. Primer: Rust inhibitor.
 - 2. Topcoat: Thermosetting polyester powder coat. UV, chip, and flake resistant.
 - 3. Test Results: "Pangard II".
 - a. Gloss, Garner 60 Degrees, ASTM D 523: Plus or minus 5.
 - b. UV Resistance, Color and Gloss, ASTM G 155, Cycle 7: Delta E less than 2 at 2.0 mils and less than 20 percent loss.
 - c. Cross-Hatch Adhesion, ASTM D 3359, Method B: 100 percent pass.
 - d. Flexibility Test, Mandrel, ASTM D 522: 3 mm at 2 mils.
 - e. Erichsen Cupping, ISO 1520: 8 mm.
 - f. Impression Hardness, Buchholz, ISO 2815: 95.
 - g. Impact Test, ASTM D 2794: 60 inches/pound at 2.5 mils.
 - h. Pencil Hardness, ASTM D 3363: 2H minimum.
 - i. Corrosion Resistance, 1,500-Hour Test, ASTM B 117: Max. undercutting 1 mm.
 - j. Humidity Resistance, 1,500-Hour Test, ASTM D 2247: Max. blisters 1 mm.

- C. Stainless Steel: #4 satin electropolish finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.

3.3 ADJUSTING

- A. Finish Damage: Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- B. Component Damage: Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.4 CLEANING

- A. Clean furnishings promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

3.5 PROTECTION

- A. Protect installed furnishings to ensure that, except for normal weathering, furnishings will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 22 05 01 BASIC PLUMBING REQUIREMENTS

PART 1 - GENERAL

1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions and Division 01 apply to work specified in this Division.

1.2 Scope of Work - Plumbing

- A. The scope of the Plumbing work includes furnishing, installing, testing and warranty of all Plumbing work and complete plumbing systems shown on the Plumbing drawings and specified herein.

1.3 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.

1.4 Inspection of Site

- A. Each bidder shall inspect the project site. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the Contract is signed, no allowance will be made for failure to have made a thorough inspection.

1.5 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to insure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay.
- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The Contract Drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having pipe and fittings

fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install piping and equipment.

- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where considered desirable in the interest of concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment or piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by National Electric Code (NEC) 110.16 Spaces About Electrical Equipment 600 Volts Nominal or Less. For equipment rated over 600 Volts Nominal – 110.32 Work Space Above Equipment – 110.33 Entrance and Access to Work Space – 110.34 Work Space and Guarding.
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of equipment, piping, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings, necessary drains and minor valves, traps and devices required to complete the installation, or for the proper operation of the system. The Contractor shall exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that they are relieved of the work which is specified under their branch until instructions in writing are received from the Construction Manager.

1.6 Coordination Drawings

- A. The Contractor shall initially prepare and be responsible for 0.25" scale coordination drawings. These drawings shall be produced using a computer aided drafting software of a mutually agreed upon format and distributed to the Plumbing, HVAC and Electrical Contractors for their input and revisions. Assure that all Contractors work together to obtain finish coordinated drawings with no work being installed until all Contractors have approved and signed-off with their approval and drawings have been submitted and reviewed by the Architect and Engineer.

1.7 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Construction Manager and Architect.

- B. Final inspection certificates shall be obtained by the Contractor and given to the Construction Manager and Owner.

1.8 Record Drawings

- A. The Contractor shall maintain a separate set of prints of the Contract Documents and shall show all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work, these drawings shall be turned over to the Construction Manager.

1.9 Operating and Maintenance Manuals

- A. Three copies each of operating and maintenance manuals shall be assembled for Plumbing work by the Contractor.
- B. All shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. Pipe pressure test reports, domestic water disinfection certificate of completion and bacteriological analysis results shall also be included. In addition, the Contractor shall prepare a chart listing all items of equipment which are furnished under this Contract and indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required.
- C. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Construction Manager for review. Upon approval, manuals shall be turned over to the Owner.

1.10 Final Inspection and Punch List

- A. As the time of work completion approaches, the Contractor shall survey and inspect the work and develop their own punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Engineer's or Architect's obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.
- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Construction Manager within 30 days of receipt of the Construction Manager's punch list.

1.11 Warranty

- A. This Contractor shall warrant all workmanship, equipment and material entering into this Contract for a period of one year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during this warranty period shall be made good by this Contractor without expense to the Owner.
- B. This provision is intended specifically to cover deficiencies in Contract completion or performance which are discovered after systems are placed in operation.
- C. This provision shall not be construed to include maintenance items such as re-tightening or repacking glands, greasing, oiling, belt tightening and cleaning strainers after these have been done for final close-out.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

PART 2 - PRODUCTS

2.1 Materials and Equipment

- A. Materials and equipment furnished under this Contract shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.

2.2 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the authority having jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

2.3 Equipment Selection

- A. The selection of materials and equipment to be furnished under this contract shall be governed by the following:
 - 1) Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between any one of the several specified. All products shall be first quality line of manufacturer's listed.
 - 2) Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Construction Manager during the bidding period in sufficient time to be included in an addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.

- 3) Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Approval of equal equipment by other manufacturers must be obtained per paragraph 2.3.A.2 above.
- B. Before bidding equipment, and again in the preparation of shop drawings, the Contractor and their supplier shall verify that adequate space is available for entry and installation of the item of equipment, including associated piping and accessories. Also verify that adequate space is available for servicing of the equipment.
- C. If extensive changes in pipe or equipment layout, or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in the Contract.

2.4 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information shall be assembled by the Contractor of equipment and materials furnished in their Contract, and submitted to the Construction Manager for review as stated in the General Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review.
- B. The review of shop drawings by the Construction Manager, Architect or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings. Deviations from specifications and drawing requirements shall be called to the Architect's and Engineer's attention in a separate clearly stated notification at the time of submittal for the Architect's and Engineer's review.
- C. Shop drawings and product data of the following Plumbing equipment and materials shall be submitted:
 - 1) Pipe, fittings and joining methods for the various systems.
 - 2) Pipe hangers and saddles.
 - 3) Expansion Loops.
 - 4) Sleeves.
 - 5) Firestopping.
 - 6) Labels, Markings and Tags.
 - 7) Valves.
 - 8) Supply system specialties, including hose bibbs.
 - 9) Drainage system specialties.
 - 10) Plumbing Pumps

PART 3 – EXECUTION

3.1 Pipe Testing

- A. All piping provided in this work shall be pressure tested, as specified below.
- B. Pipe testing for Plumbing piping shall be:
 - 1) Domestic cold water piping - hydrostatic at 125 psig or 1.50 times the maximum operation pressure of the system, whichever is higher, for 6 hours at the low point of the system.
 - 2) Soil, waste and vent piping and storm piping - rough test and final test, in conformance to Plumbing Code requirements.
- C. Testing shall be performed prior to application of insulation. Insure that air is vented from piping when piping is hydrostatically tested.
- D. Tests shall be witnessed by field representatives of the Construction Manager or Architect or shall be monitored by a recorder. Furnish a written record of each piping system test indicating date, system, pressure, duration and results of tests. Copies of test reports shall be included in the O&M manuals.
- E. Leaks discovered during testing shall not be patched. Threaded connections shall be either tightened or replaced. Small leaks in welded pipe may be chipped and rewelded.

3.2 Pipe Cleaning

- A. Before placing each water piping system in operation, the piping system shall be thoroughly flushed out with clean water. Remove, clean and replace all strainer screens once flushing is complete. On domestic water systems, remove, clean and replace all fixture mounted strainer screens and faucet aerators after fixtures are set and connected piping is flushed thru the fixtures.
- B. Refer to appropriate Sections for cleaning of other piping for normal operation.

3.3 Disinfection of Piping

- A. All new and any existing domestic water piping out of service more than 30 days shall be disinfected by a company or personnel regularly engaged in the performance of this service.
- B. Keep new piping isolated from the service piping until after disinfection is completed and proven acceptable by bacteriological test results. Provide a service cock at the point of connection for injection of the disinfecting agent. If it is necessary to use a potable water supply in the performance of the disinfection procedures, provide temporary reduced pressure zone back flow prevention until disinfection and analysis results are complete.

- C. Thoroughly flush the system, as previously described, prior to disinfection. Disinfection shall be performed in accordance with AWWA C651 Standards. Disinfection shall be by means of a chlorine solution injected into the water system near the source. Each outlet shall be tested to prove presence of minimum chlorine concentration. Document that adequate levels of chlorine are present in each pipe section. Following the appropriate retention period, flush out the system with clean water until the residual free chlorine content is equal to the level of the incoming water, but not greater than 1.5 parts per million or until approved by the Health Department.
- D. Perform a bacteriological analysis of the potable water system. One test sample shall be collected from the end of the main and one from each branch. Provide certification stating the name of the lab performing the testing, the job name, the date of the sample and results of the testing.
- E. Disinfection procedures shall be witnessed or approved by the Construction Manager, Architect or other qualified representative, who shall present the Contractor with a letter or certificate of completion.

3.4 Operation and Adjustment of Equipment

- A. As each piping system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include balancing water systems, tightening packing glands, and adjusting all operating equipment.
- B. Test relief valves, air vents and regulating valves to insure proper operation.

3.5 Operating Demonstration and Instructions

- A. The Contractor shall set the various systems into operation and demonstrate to the Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.
- C. O&M manuals shall be submitted, reviewed and approved prior to scheduling of demonstrations.

END OF SECTION

SECTION 22 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Owner/Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the contractors.
- 1.3 The contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG or .RVT format for a cost as indicated in the Agreement and Waiver Form. **Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form.** Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All project models will be furnished without views.
- 1.9 All electronic files shall be stripped of the Project's name and address, the Architect's / and / Engineer's / and / any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and

statistical information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

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

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION



**ELECTRONIC FILES
HEAPY RELEASE FORM TO CONTRACTORS**

Project: Banks Phase 3B-BP6
Cincinnati, Ohio

Owner: Hamilton County

Heapy Engineering Project Number: 2019-07018

Heapy Engineering Project Manager: Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
 - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.

- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
 - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
 - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
 - a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:
 - a. Are suitable for any other usage or purpose.

- b. Have any particular durability.
 - c. Will not damage or impair the Recipient's computer or software.
 - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
- a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
 - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
 - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
 - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.
16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain

such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

Provider (Name of Company): _____

Recipient (Name of Company): _____

Recipient Address: _____

Name of authorized Recipient Representative: _____

Title of authorized Recipient Representative: _____

E-mail address of authorized Recipient Representative: _____

Signature of authorized Recipient Representative: _____

Date: _____

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

A. Electronic File Format (select one):

1. ☐ .DWG Format - List of Drawings Requested: _____

2. ☐ Revit Project Model Requested (Model only, no Views included)

B. File Transfer Medium (select one):

☐ CD-ROM ☐ DVD-ROM ☐ Heapy FTP ☐ User's FTP site ☐ Flash Drive

C. Delivery of Electronic Files Cost Summary:

Available Electronic .DWG file format:

☐ 2018 DWG

If a different file version is required than the indicated available version state the requested version:

_____ .DWG

SECTION 22 05 04 BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 Construction Water

- A. Refer to Division 01, for information regarding construction water.
- B. Cost of water use for construction is not included in Division 22.
- C. Remove construction water meter and piping when no longer required.

1.2 Continuity of Services

- A. Work shall be so planned and executed as to provide reasonably continuous service of existing systems throughout the construction period. Where necessary to disrupt services for short periods of time for connection, alteration or switch-over, the Construction Manager and Owner shall be notified in advance and outages scheduled at the Owner's reasonable convenience.
- B. Submit, on request, a written step-by-step sequence of operations proposed to accomplish the work. The outline must include tentative dates, times of day for disruption, downtime and restoration of services. Submit the outline sufficiently in advance of the proposed work to allow the Architect or Engineer to review the information with the Construction Manager and Owner. Upon approval, final planning and the work shall be done in close coordination with the Construction Manager and Owner.
- C. Shutdown of systems and work undertaken during shutdown shall be bid as being done outside of normal working hours.

1.3 Sleeve Placement Coordination Drawings

- A. Prepare coordination drawings showing size, type, location and material of plumbing sleeves. Refer to Division 01 and section 22 05 07 for additional information.
- B. Submit coordination drawings in accordance with Division 01 requirements, at least 14 calendar days before the first scheduled concrete pour.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades.

Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.

- B. Plumbing work shall be performed by licensed Plumbing Contractors in accordance with requirements of the jurisdiction.

3.2 Protection

- A. Each Contractor shall be entirely responsible for all material and equipment furnished in connection with their work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Construction Manager.

3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where pipes are to pass through walls, partitions, floors or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, cut holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building in this work shall be repaired or rectified. Contractor shall coordinate the location of sleeves provided under previous bid package.
- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

3.4 Painting

- A. Coordinate with Construction Manager for extent of painting required.
- B. Refer to Division 09 – Finishes for methods to be utilized.

END OF SECTION

SECTION 22 05 05 FIRESTOPPING

PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of piping thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements and pipe layouts.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814 and E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC and the authority having jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of UL firestopping assemblies and installation instructions. Submittals shall include all information required in the OBC / Chapter 1, Section 106 and Chapter 7, Section 712.

PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Tremco, Specified Technologies, or engineer approved equal.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680, Metacaulk 66590 Series or engineer approved equal.

PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.

- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.
- 3.3 Refer to Section 22 05 07 Piping Materials and Methods for Plumbing for pipe sleeve requirements and treatment of penetrations not requiring firestopping.

END OF SECTION

SECTION 22 05 07 PIPING MATERIALS AND METHODS

PART 1 - GENERAL

- 1.1 Piping materials and methods for piping common to Division 22 Plumbing shall be as specified herein and as shown on the drawings.
- 1.2 Included in this Section are:
 - A. Pipe, fittings and joining methods.
 - B. Unions and flanges.
 - C. Dielectric connectors.
 - D. Pipe sleeves, openings, curbing and escutcheons.
 - E. Installation methods of piping.
- 1.3 Refer to other Sections in Division 22 for selection of piping materials for the various services. Piping materials and installation methods peculiar to certain individual systems are specified in Sections related to those systems. Refer also to firestopping requirements in Division 07.
- 1.4 Refer to Section 22 05 05 Firestopping and Division 07 for firestopping requirements.
- 1.5 Brazing procedures shall be per ANSI B31.5 and the ASTM boiler and Pressure Vessel Code SFA-5.8 Section II.
- 1.6 Soldering procedures per ANSI B16.18.
- 1.7 Pipe sleeves, floor and wall openings, water protective curbing and escutcheon plates shall be provided as described below. Pipe sleeves shall be placed in all floor slabs, poured concrete roof decks, walls and partitions, except as noted below, to allow new piping to pass thru and to allow for expansion, contraction and normal movement of the pipe. Refer to Section 22 05 04 Basic Plumbing Materials and Methods, Article 1.3, for sleeve placement coordination drawings.
- 1.8 Sleeves are not required:
 - A. In floor slabs on grade.
 - B. In core drilled openings in solid concrete not requiring water protection. Sleeves are required at concrete block walls, to facilitate containment of required firestopping material.
 - C. In large floor openings for multiple pipe risers which are within a fire rated shaft, unless the opening is to be closed off with concrete or other material after pipes are set.

- 1.9 Where pipes penetrate walls and floors other than those required to be fire rated, the annular space between the sleeve, core drilling or opening and the pipe or pipe insulation shall be closed to retard the passage of smoke.

PART 2 - PRODUCTS

- 2.1 Copper tubing, conforming to ASTM B88, Standard Specification for Seamless Copper Water Tube and Fittings and Joints, shall be:
- A. Type C1
Pipe - Type "L" seamless hard drawn copper tubing.
Fittings - wrought copper or cast bronze, solder ends.
Joints - soldered with lead-free tin alloy, 95-5 tin-antimony or silver-bearing tin in accordance with methods of ASTM B828 and equal to Harris "Stay-Brite", "Stay-Brite 8" or "Bridgit", or engineer approved equal. Solder shall meet ASTM B32.
 - B. Type C2
Pipe - Type "L" seamless hard drawn copper tubing.
Fittings - wrought copper or cast bronze, solder ends.
Joints - brazed with 15% silver brazing alloy equal to Harris "Stay-Silv 15", Harris "Dynaflow", or engineer approved equal. Brazing filler shall meet AWS A5.8.
- 2.2 Unions and flanges shall be:
- A. Unions on copper tubing, all bronze construction 150 lb., solder ends.
- 2.3 A dielectric connector shall be incorporated at each connection between ferrous and non-ferrous piping. Connectors shall be:
- A. Dielectric coupling with non-conductive polymer liner, Victaulic Style 47, Gruvlok "Di-Lok", Lochinvar Corp. "V-Line", or engineer approved equal, dielectric fitting on services 200 degrees and less, and pressures less than 300 psi.
 - B. Dielectric flange with non-metallic bolt hole grommets and gasket.
- 2.4 Pipe sleeves shall be:
- A. All other sleeves: Schedule 40 PVC, Type 1, ASTM D-2466, **color gray**.

PART 3 - EXECUTION

- 3.1 Pipe and tubing shall be cut and fabricated to field measurements and run parallel to normal building lines. Pipe ends shall be cut square and ends reamed to remove burrs. The pipe interior shall be cleaned of foreign matter before erection of the pipe.
- 3.2 Piping shall be pitched for drainage. The low points shall be fitted with a 0.75" drain valve (with hose thread adapter if not piped to a floor drain) except that on piping 1.25" and smaller where a drain valve is not shown, a drain plug is acceptable.

- 3.3 Piping shall be installed consistent with good piping practice, run concealed wherever possible and located as to be protected from damage by freezing. Coordinate with other trades to attain a workmanlike installation.
- 3.4 Internals of sweat end valves shall be removed when damage or warping could occur due to applied heat of soldering. Where silver brazing is specified, solder connection of valves shall be used to reduce the danger of damage.
- 3.5 Close open ends of piping during installation to keep interior of the pipe clean.
- 3.6 Piping shall not be run above electrical switchgear or panelboards, nor above the access space in the immediate vicinity of the equipment, in accordance with the N.E.C.
- 3.7 Unions and flanges shall be installed as required for erection purposes. A union shall be installed at each threaded shut-off valve on the side of the valve for which shut-off service is intended.
- 3.8 Refer to 22 05 05 Firestopping. Pipe sleeves which are a part of firestopping assemblies shall conform to the requirements of the assembly with particular emphasis regarding size, annular space, length, passage or non-passage of insulation and the installation of the sleeves.
- 3.9 Pipe sleeves shall be placed and coordinated in the initial stages of construction before concrete, masonry and other general construction activity. Means shall be taken to assure that the sleeve will not move during or after construction. Beams, columns and other structural members unless noted otherwise shall not be sleeved except upon approval of the Architect.
- 3.10 Length of wall sleeves shall be such that the sleeve ends are substantially flush with both sides of the wall or partition. Floor sleeves shall be flush with the bottom and top of the floor slab except, in mechanical rooms and other areas which might have water on the floor, sleeves shall project a minimum of 1" above finished floor. Refer to sleeve schedule on drawings for required sleeve sizes.
- 3.11 In lieu of firestopping and where permitted by the OBC, uninsulated metallic pipes requiring no pipe sleeves in passing thru concrete floors or concrete or masonry walls or partitions, the annular space shall be closed full depth of the penetration with materials and methods compatible with the floor, wall or partition material (concrete, grout or mortar).
- 3.12 Where firestopping is not required, the annular space between the sleeve, core drilling or opening and the pipe or pipe insulation shall be closed with caulking to retard the passage of smoke.

END OF SECTION

SECTION 22 05 17 EXPANSION LOOPS FOR PLUMBING PIPING SYSTEMS

PART 1 – GENERAL

- 1.1 System Description: Domestic water pipe expansion loops with flexible metal hose sections shall be provided to accommodate building expansion and contraction. Pipe anchors and pipe alignment guides shall be provided in conjunction with expansion loops. Pipe alignment guides shall be provided in conjunction with flexible “V” connectors.

PART 2 - PRODUCTS

- 2.1 Pipe expansion loops shall consist of two sections of flexible metallic pipe, connected by a 180° return bend or two 90° elbows with an intervening rigid or flexible pipe section, and 90° elbows with flanged or copper sweat ends, for connections to the piping main. Flexible metallic pipe shall be constructed of seamless corrugated inner tubing of Type 321 stainless steel or tin-bronze with woven wire braid outer jacket of the same alloy. Working pressure for stainless steel shall be 150 psi at 350 degrees and for tin-bronze 100 psi. Expansion loops shall be Metraflex “Metraloop” Flex-Hose, “Tri-Flex Loop”, Engineered Flexible Products, Mason, or Engineer approved equal.
- 2.2 Flexible “V” connectors shall consist of two sections of flexible metallic pipe, connected by a 90° return bend with integral drain port, and 45° elbows with flanged or copper sweat ends, for connection to the piping main. Flexible metallic pipe shall be constructed of seamless corrugated inner tubing of Type 321 stainless steel or tin-bronze with woven wire braid outer jacket of the same alloy. Working pressure for stainless steel shall be 150 psi at 350 degrees and for tin-bronze 100 psi. “V” connectors shall be manufactured by Metraflex, Mason, Twin City Hose, Engineered Flexible Products, or engineer approved equal.
- 2.3 Expansion loops and “V” connectors in piping crossing building expansion joints shall have flexible sections in all segments of the loop.
- 2.4 Alignment guides shall consist of a guide spider to be clamped to the pipe and a guide body with support attachment means. Guides on cold services shall have an integral thermal barrier. Bracing steel and attachments, cables, concrete inserts and other attachments to the structure shall be sized for the required stress loads.

PART 3 – EXECUTION

- 3.1 Expansion loops and “V” connectors shall be installed in accordance with manufacturer’s instructions.
- 3.2 Pipe anchors shall be provided in conjunction with expansion loops. Anchor assemblies and attachment to the building structure shall be designed to overcome resistive and frictional forces of the loops and joints.
- 3.3 Pipe guides shall be placed on each side of the expansion loop or “v” connector, attached to the building structure. Number and spacing shall be in accordance with manufacturer’s instructions.

- 3.4 Expansion loops shall be supported from the structure at the 180° return bend or at the intervening section where a return bend is not incorporated. Provide a 0.25" ball valve for drain or air venting where the loop is not installed in the horizontal plane.

END OF SECTION

SECTION 22 05 23 GENERAL DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

- 1.1 Refer to Section 22 11 16 Interior Domestic Water Piping and Section 22 11 19 Interior Domestic Water Piping Specialties for selection of valves for the various services. Valves peculiar to individual systems are referenced or specified in Sections related to those systems.
- 1.2 Valves and materials shall comply with applicable standards and specification of ANSI, ASTM, ASME and MSS. Working pressure and temperature ratings of each valve shall exceed those imposed by the service in which it is applied.
 - A. ASTM B584 and ASTM B61 Copper Alloy Sand Casting for General Applications.
 - B. MSS SP-80 Bronze Gate, Globe and Check Valves.
 - C. ASME B16.34, MSS SP-110 Ball Valves Threaded, Socket-Welded, Solder Joint, Grooved and Flared Ends.
 - D. Bronze valves made with copper alloy (brass) containing more than 15% zinc are not permitted.
- 1.3 All piping, fittings, valves, solders, fluxes, seals, fixtures, appurtenances and other equipment in which wetted parts are in contact with water, installed in public drinking water systems and plumbing systems providing potable and/or drinking water for human consumption shall conform to the "Lead Free" requirements of NSF 61 Annex G and NSF/ANSI 372.

PART 2 - PRODUCTS

- 2.1 Valves installed in potable and drinking water systems shall be:
 - A. Ball Valves - Nibco, Grinnell, Apollo, Stockham, Milwaukee, Hammond, Watts, Kitz, Crane, Marwin, or engineer approved equal.
 - 1) Type B1. 2" and smaller.
Nibco T-585-70, 150 w.s.p., two-piece bronze body, ASTM B584, screwed ends, chrome plated full bronze ball and bronze stem, TFE seat and seal, handle.
- 2.2 Valves installed in non-potable and non-drinking water systems shall be:
 - A. Ball Valves - Nibco, Grinnell, Apollo, Stockham, Milwaukee, Hammond, Watts, Kitz, Crane, Marwin, or engineer approved equal.
 - 1) Type B3. 2.50 inches and 3 inches.
NIBCO T 580 70-66, 150 s.w.p., 600 w.o.g., two piece bronze body, ASTM B584 screwed ends, 316 stainless steel ball and stem, standard

port, packing nut with adjustable stem packing, reinforced TFE seat and seal, handle.

2) Type B4

Watts G-4000-FDA or American 3700, 200 c.w.p., two-piece fused epoxy coated cast iron body (inside and out), flanged ends, stainless steel or PFA fused cast iron ball and stainless steel stem, full port, PTFE seat and seal, handle.

- 2.3 Sweat end valves of equal construction and features are acceptable in lieu of those specified with screwed ends.
- 2.4 Ball valves in piping which is to be insulated shall have extended shaft necks to accommodate the insulation.

PART 3 - EXECUTION

- 3.1 Drain valves shall be the same as for shutoff service. Provide a 0.75" hose thread adapter on the outlet of each drain valve that is not piped to a drainage point.
- 3.2 Internals shall be removed and the remaining elements of sweat end valves shall be protected against heat damage during soldering or brazing.
- 3.3 Valves shall be installed with the stem at or above the centerline of the pipe. Valves shall be located to be accessible for operation, servicing and/or removal.
- 3.4 Packing glands shall be tightened before placing the valves in service.

END OF SECTION

SECTION 22 05 29 HANGERS AND SUPPORTS FOR PLUMBING PIPING

PART 1 - GENERAL

- 1.1 All interior piping shall be supported from the building structure.

PART 2 - PRODUCTS

- 2.1 Manufacturers listed below are basis of design. Other applicable manufacturers are B-line, Erico, Fee, Mason and PHD, or engineer approved equal.
- 2.2 Hangers and supports for horizontal piping shall be equal to:
- A. General service - clevis type - Anvil Fig. 260.
 - B. Uninsulated copper tubing - copper plated clevis type - Anvil Fig. CT-65 (or plastic coated clevis).
- 2.3 Hanger rods shall be solid galvanized steel, threaded-end or all-thread rod, of diameter listed below. A hanger attachment device (beam clamps, concrete inserts, etc.) and locking nuts at the hanger attachment shall be provided on each hanger. Locking nuts shall be provided at each clevis and trapeze type hanger.

Pipe Sizes	Min. Rod Dia.
1" and smaller	0.25"
1.25" to 3"	0.375"
4" to 6"	0.50"
8"	0.625"

- 2.4 Where the length of the hanger rod between the top of the hanger and the attachment device is 3" or less, clevis type hangers with rollers, Anvil Fig. 181, shall be used to allow for expansion travel.
- 2.5 Hanger rod attachment devices for attachment to the structure shall be:
- A. After-set galvanized steel expansion type concrete inserts.
- 2.6 Galvanized steel spring and neoprene isolators in hanger rods, as required in Part 3, shall be equal to Mason Series 30N except in pipe sizes 6" and larger shall be Series PC30N.
- 2.7 Base mounted pipe supports shall be galvanized or stainless steel equal to Anvil catalog numbers as follows:
- A. Pipe slide having carbon steel base (with guide arrangement) and inverted tee with Teflon slide plate on each - Fig. 257, type 3.
 - B. Base mounted pipe roller stand - Fig. 271.
- 2.8 Pipe riser supports shall be galvanized steel as follows:

- A. Riser clamps on domestic cold water service piping 1.50" and smaller - similar to Pipe Shields, Inc. E1000.
- 2.9 Hangers on insulated horizontal piping shall be oversized to surround the pipe insulation. To protect the insulation from damage or inordinate compression due to concentrated weight, the following shall be provided at each hanger:
 - A. Pipe 2" and smaller - Anvil Fig. 168 18 ga. sheet metal rib-lock shield with belled ends, 12" long.
- 2.10 Insulation saddles shall be compatible with pipe insulation materials and thicknesses. Vapor barrier shall be continuous.
- 2.11 The piping contractor and the insulator shall coordinate the items above during the bidding period and determine, consistent with industry practice, the selection, furnishing and installation of the needed components.

PART 3 - EXECUTION

- 3.1 Spacing of hangers shall be as follows:
 - A. Copper tubing (vertical) - at the base and 10 ft. maximum spacing unless otherwise shown.
 - B. Copper tubing (horizontal) - 6 ft. spacing for tubing 1.25" size and smaller, 8 ft. spacing for 1.50" and 2" sizes, 10 ft. spacing for tubing 2.50" size and larger.
 - C. Cast iron pipe (vertical) - at the base and at each floor (15 ft. maximum spacing).
 - D. Cast iron pipe (horizontal) - at each fitting and at each joint on straight lengths, 10 ft. maximum spacing.
- 3.2 Attachment of pipe hangers to the structure shall be with:
 - A. After-set concrete inserts, in 4" minimum depth concrete, set in drilled holes. Powder actuated driven fasteners are not permitted.
- 3.3 Pipe hangers shall be adjusted to proper elevation, hanger rods set in a vertical position and locking nuts secured before pipe insulation is installed.
- 3.4 Extended legs of pipe riser clamps shall be shortened as needed to maintain concealment of the clamp within the pipe chase. Insure that adequate support is still maintained.

END OF SECTION

SECTION 22 05 53 IDENTIFICATION OF PLUMBING PIPING

PART 1 - GENERAL

- 1.1 Identification of Plumbing equipment shall consist of equipment labeling, pipe marking and valve tagging as specified hereinafter.
- 1.2 Pipe markings shall be applied to all piping.
- 1.3 Each shutoff valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8.50" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (room or area) and service (e.g. - south wing cold water).
- 1.4 Labels, tags and markers shall comply with ANSI A13.1 for lettering size, colors and length of color field.
- 1.5 Coordinate pipe markings and valve tags with HVAC and Fire Suppression Contractors to assure similar markings.

PART 2 - PRODUCTS

- 2.1 Equipment labeling shall be either, or a mix, of the following:
 - A. Permanently attached engraved brass or plastic laminated signs with 1" high lettering. Signs on exterior equipment shall be brass.
 - B. Stencil painted identification, 2" high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.
- 2.2 Pipe markings shall be:
 - A. Plastic semi-rigid snap-on type, manufacturer's standard pre-printed color coded pipe markers extending fully around the pipe and insulation or pressure-sensitive vinyl markers similar to the above.
 - B. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.
- 2.3 Valve tags shall be polished brass or plastic laminate with solid brass S hook. Tags shall be engraved with "P" (for Plumbing) and the designated number.
- 2.4 Labels, markings and tags shall be manufactured by W.H. Brady, Seton, Allen, Kolbi, Industrial Safety Supply, or engineer approved equal.

PART 3 - EXECUTION

- 3.1 Identification labeling, marking and tagging shall be applied after insulation and painting has been completed.

- 3.2 Coordinate names, abbreviations and other designations used in Plumbing identification work, with corresponding designations shown, specified or scheduled on drawings.
- 3.3 The Plumbing and HVAC Contractors shall coordinate labeling, marking and tagging to attain coordinated and consistent systems of identification.
- 3.4 Pipe markers shall be placed:
 - A. At 25 ft. centers in mechanical rooms and concealed spaces.
 - B. At 50 ft. centers in other exposed locations.
 - C. On mains at each branch take-off.
 - D. At least once in each room.
- 3.5 Refer to appropriate Sections of this specification for installation of underground line marker tape.
- 3.6 Valve tags shall be placed on each valve. Valve tag schedules shall be prepared as specified above. Copies of one set of schedules shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION

SECTION 22 11 16 INTERIOR DOMESTIC WATER PIPING

PART 1 - GENERAL

- 1.1 Piping, valves and associated devices and materials for interior domestic cold water systems shall be provided as shown on the drawings and as specified.
- 1.2 Refer to Section 22 05 07 - Piping Materials and Methods for Plumbing, Section 22 05 23 – General Duty Valves for Plumbing Piping, Section 22 05 29 Hangers and Supports for Plumbing Piping and other related Sections for required provisions.

PART 2 - PRODUCTS

- 2.1 Water piping and associated devices, materials and accessories shall be as described in Section 22 05 07 Piping Materials and Methods for Plumbing. Piping shall be:
 - A. 2" and smaller - Type C1.
- 2.2 Valves for the various services shall be as listed below and as described in Section 22 05 23 General Duty Valves for Plumbing Piping.
 - A. Shutoff
 - 1) Ball B1

PART 3 - EXECUTION

- 3.1 Installation shall conform to provisions in Section 22 05 07 Piping Materials and Methods for Plumbing, 22 05 17 Expansion Loops for Plumbing Systems and Section 22 05 29 Hangers and Supports for Plumbing Piping.

END OF SECTION

SECTION 22 11 19 INTERIOR DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

- 1.1 Water system specialties shall be provided as shown on the drawings and as specified here and/or on the drawings.
- 1.2 Refer to Section 22 05 07 Piping Materials and Methods for Plumbing, Section 22 05 23 General Duty Valves for Plumbing Piping, Section 22 05 19 Meters and Gauges for Plumbing Piping (for thermometers and pressure gauges) and Section 22 11 16 Interior Domestic Water Piping.

PART 2 - PRODUCTS

- 2.1 Hose bibbs shall be all brass construction with removable tee handle, 0.75" hose thread outlet and integral vacuum breaker. Hose bibbs shall be Chicago Faucet No. 998 with rough chrome finish, T & S Brass, Zurn, or engineer approved equal.

PART 3 - EXECUTION

- 3.1 Hose bibbs shall be mounted approximately 36" above the slab.

END OF SECTION

SECTION 22 13 16 INTERIOR DRAINAGE AND VENT SYSTEMS

PART 1 - GENERAL

- 1.1 Interior drainage and vent systems including soil, waste and vent system and storm drainage system shall be provided as shown on the drawings and as specified.
- 1.2 Refer to Section 22 05 09 Excavation Backfill and Surface Restoration, Section 22 05 07 Piping Materials and Methods for Plumbing, Section 22 05 29 Hangers and Supports for Plumbing Piping and other related Sections for provisions affecting this Section.
- 1.3 All referenced standards shall be of the latest edition adopted by the jurisdiction unless specifically noted otherwise.
- 1.4 All cast iron drainage and vent pipe, fittings and joining materials shall be listed to the respective standard(s) stated below, and shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute.

PART 2 - PRODUCTS

2.1 Storm Drainage Piping

A. Pipe, fittings and joints above grade shall be:

- 1) Coated cast iron pipe, centrifugally cast, with hub and spigot ends, ASTM A74. Fittings shall be drainage type. Joints shall be push-tight with elastomeric gaskets, ASTM C564 and ASTM C1563.
- 2) Pipe shall be coated cast iron, centrifugally cast with hubless ends, ASTM A-888 and CISPI 301. Joints shall consist of a neoprene gasket ASTM C564, and type 304 corrugated stainless steel shield and clamp assembly, ASTM C1540 complaint, as manufactured by Clamp-All 125, Husky "SD 4000", Mission "Heavy Weight", or engineer approved equal.

PART 3 - EXECUTION

- 3.1 Cut pipe to required length and ream ends to remove burrs. Align horizontal piping to attain even pitch, minimum of 0.25" per ft. on sizes 2.50" and smaller, 0.125" per ft. on sizes 3" and larger unless specifically noted on drawings.
- 3.2 Piping shall not be run above electrical switchgear or panelboards, nor above access space in the immediate vicinity of the equipment, in accordance with N.E.C. Article 110.26.
- 3.3 Gasket lubricant shall be used in the assembly of push-tight joints.
- 3.4 Horizontal above grade cast iron piping, in sizes 5" and larger, shall be braced to prevent horizontal movement and joint separation at each branch opening and change of

direction. Bracing methods shall be as recommended by pipe manufacturer's installation instructions and the Cast Iron Soil Pipe Institute (CISPI) Handbook.

3.5 Provide cleanouts in drainage piping as indicated on the drawings and:

- A. In horizontal piping at intervals no greater than 100 ft.
- B. At the base of each downspout.
- C. In storm piping leaving the building for cleanout and testing purposes.

END OF SECTION

SECTION 22 13 19 DRAINAGE SYSTEMS SPECIALTIES

PART 1 - GENERAL

- 1.1 Drainage systems specialties shall be as shown on the drawings and as specified.

PART 2 - PRODUCTS

- 2.1 Drains shall be as shown and scheduled on the drawings. Drains shall be equal to listed catalog numbers, type, size, materials and features. Drains shall be manufactured by J.R. Smith, Wade, Josam, Watts, Mifab, Zurn, or Engineer approved equal.
- 2.2 Cleanouts
- A. Cleanouts shall be of the same manufacturer as floor drains and equal to the listed catalog numbers in type, materials and features.
 - B. Exterior cleanouts in areas not subject to vehicular traffic shall be J.R. Smith Series 4220 (or engineer approved equal). Cleanouts shall consist of a cast iron two-piece adjustable housing, ABS, cast iron or bronze NPT gasketed plug and round non-slip cast iron top with securing screw. In areas with decorative paving, tops shall be nickel bronze or bronze.
 - C. Exterior cleanouts in areas subject to vehicular traffic shall be J.R. Smith Series 4250 (or engineer approved equal). Cleanouts shall consist of ABS or cast iron gasketed plug, heavy duty double flanged housing and round non-slip cast iron cover with securing screws.
 - D. Refer to Part 3 for installation and concrete anchorage of exterior cleanout covers at grade.

PART 3 - EXECUTION

- 3.1 Drains shall be set with rim 0.75" below finish floor level unless otherwise noted or directed. Verify exact location and desired rim elevations with the Construction Manager before installation.
- 3.2 Cleanouts shall be same size as pipe thru 4" size. Maximum size of cleanouts shall be 4" diameter unless larger units are required for testing or special access purposes. Provide cleanouts where indicated on the drawings and at other locations where deemed advisable. Location of cleanouts as stipulated by applicable code shall be considered as the minimum requirement.

END OF SECTION

SECTION 26 05 01 BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 Special Note

- A. All provisions of the Bidding Requirements, General Conditions and Supplementary Conditions, including Division 00 and Division 01, apply to work specified in this Division.
- B. The scope of the Division 26 work includes furnishing, installing, testing and warranty of all Division 26 and 28 work and complete systems as shown on the Division 26 and 28 drawings and as specified in Division 26 and 28 and elsewhere in the project documents.

1.2 Permits and Regulations

- A. Include payment of all permit and inspection fees applicable to the work in this Division. Furnish for the Owner certificates of approval from the governing inspection agencies, as a condition for final payment.
- B. Work must conform to the National Electrical Code, National Electrical Safety Code and other applicable local, state and federal laws, ordinances and regulations. Where drawings or specifications exceed code requirements, the drawings and specifications shall govern. Install no work contrary to minimum legal standards.
- C. All electrical work shall be inspected and approved by the local jurisdictional authority.
- D. All Electrical work shall be inspected and approved by the City of Cincinnati who will issue the Inspection Certificates.

1.3 Inspection of Site

- A. Inspect the project site and the premises of the existing building. Conditions shall be compared with information shown on the drawings. Report immediately to the Construction Manager any significant discrepancies which may be discovered. After the contract is signed, no allowance will be made for failure to have made a thorough inspection.

1.4 Drawings and Specifications

- A. The drawings indicate the general arrangement of the work and are to be followed insofar as possible. The word "provide", as used, shall mean "furnish and install". If significant deviations from the layout are necessitated by field conditions, detailed layouts of the proposed departures shall be submitted to the Construction Manager for approval before proceeding with the work.
- B. Make all necessary field measurements to ensure correct fitting. Coordinate work with all other trades in such a manner as to cause a minimum of conflict or delay. Refer to Division 21 for required coordination and coordination drawings involving all trades.

- C. The drawings and specifications shall be carefully studied during the course of bidding and construction. Any errors, omissions or discrepancies encountered shall be referred immediately to the Construction Manager for interpretation or correction, so that misunderstandings at a later date may be avoided. The contract drawings are not intended to show every vertical or horizontal offset which may be necessary to complete the systems. Having bus duct, wireways and fittings fabricated and delivered in advance of making actual measurements shall not be sufficient cause to avoid making offsets and minor changes as may be necessary to install bus duct, wireways, fittings and equipment.
- D. The Architect shall reserve the right to make minor adjustment in locations of system runs and components where he considers such adjustments desirable in the interest of protecting and concealing work or presenting a better appearance where exposed. Any such changes shall be anticipated and requested sufficiently in advance as to not cause extra work, or unduly delay the work. Coordinate work in advance with all other trades and report immediately any difficulties which can be anticipated.
- E. Equipment, ductwork and piping shall not be installed in the dedicated electrical space above or in the working space required around electrical switchgear, motor control centers or panelboards as identified by NEC 110.26 Spaces about Electrical Equipment – 600 Volts Nominal or Less. For equipment rated over 600 volts nominal – 110.32 Work Space About Equipment – 110.33 Entrance to Enclosures and Access to Work Space – 110.34 Work Space and Guarding. Caution other trades to comply with this stipulation.
- F. Where any system runs and components are so placed as to cause or contribute to a conflict, it shall be readjusted at the expense of the contractor causing such conflict. The Architect's decision shall be final in regard to the arrangement of bus duct, conduit, etc., where conflict arises.
- G. Provide offsets in system runs, additional fittings, necessary conduit, pull boxes, conductors, switches and devices required to complete the installation, or for the proper operation of the system. Exercise due and particular caution to determine that all parts of the work are made quickly and easily accessible.
- H. Should overlap of work among the trades become evident, this shall be called to the attention of the Construction Manager. In such event, none of the trades or their suppliers shall assume that he is relieved of the work which is specified under his branch until instructions in writing are received from the Construction Manager.

1.5 Inspection

- A. All work shall be subject to inspection of Federal, State and local agencies as may be appropriate, and of the Architect and Engineer.
- B. Obtain final inspection certificates and turn over to the Construction Manager and the Owner.

1.6 Record Drawings

- A. Maintain a separate set of field prints of the contract documents and hand mark all changes or variations, in a manner to be clearly discernible, which are made during construction. Upon completion of the work and within 90 days of system acceptance, these hand marked drawings shall be turned over to the Construction Manager. This shall apply particularly to underground and concealed work, and to other systems where the installation varies to a degree which would justify recording the change.

1.7 Operating and Maintenance Manuals

- A. Assemble two copies each of operating and maintenance manuals for the Electrical work.
- B. All “approved” shop drawings and installation, maintenance and operating instruction pamphlets or brochures, wiring diagrams, parts list, and other information, along with warranties, shall be obtained from each manufacturer of the principal items of equipment. In addition, prepare and include a chart listing all items of equipment which are furnished under this contract, indicating the nature of maintenance required, the recommended frequency of checking these points and the type of lubricating media or replacement material required. Name and address of a qualified service agency. A complete narrative of how each system is intended to operate. Major items of equipment shall consist of not less than the following:
 - 1. Motor controllers.
 - 2. Specialty equipment.
 - 3. Fire alarm, communications and sound systems.
 - 4. Lighting equipment and lighting controls.
 - 5. Company switches.
- C. Standard NEMA publications on the operation and care of equipment may be furnished in lieu of manufacturer's data where the manufacturer's instructions are not available.
- D. Original purchase order number; date of purchase; name, address, and phone number of the vendor; warranty information.
- E. Copy of required test reports.
- F. These shall be assembled into three-ring loose leaf binders or other appropriate binding. An index and tabbed sheets to separate the sections shall be included. These shall be submitted to the Engineer and Construction Manager for review. Upon approval manuals shall be turned over to the Owner.

1.8 Final Inspection and Punch List

- A. As the time of work completion approaches, survey and inspect Division 26 work and develop a punch list to confirm that it is complete and finished. Then notify the Construction Manager and request that a final inspection be made. It shall not be considered the Architect's or Engineer's obligation to perform a final inspection until the Contractor has inspected the work and so states at the time of the request for the final inspection.

- B. Requests to the Construction Manager for final inspection may be accompanied by a limited list of known deficiencies in completion, with appropriate explanation and schedule for completing these; this is in the interest of expediting acceptance for beneficial occupancy.
- C. The Construction Manager will inspect the work and prepare a punch list of items requiring correction, completion or verification. Corrective action shall be taken by the Contractor to the satisfaction of Construction Manager within 30 days of receipt of the Construction Manager's punch list.

1.9 Warranty

- A. Warrant all workmanship, equipment and material entering into this contract for a period of one (1) year from date of final acceptance or date of beneficial use, as agreed to between Contractor and Construction Manager. Any materials or equipment proving to be defective during the warranty period shall be made good without expense to the Owner. Use of equipment for temporary electric is not the start of the warranty period.
- B. This provision is intended specifically to cover deficiencies in contract completion or performance which are not immediately discovered after systems are placed in operation. These items include, but are not limited to, motor controller malfunction, heater element changes required for motor controller, fuse replacement where fuses blow due to abnormal shorts, adjustments and/or replacement of malfunctioning equipment and adjusting special equipment and communication systems to obtain optimum performance.
- C. This provision shall not be construed to include maintenance items such as making normally anticipated adjustments or correcting adjustment errors on the part of the Owner's personnel.
- D. Provisions of this warranty shall be considered supplementary to warranty provisions under General Conditions.

PART 2 - PRODUCTS

2.1 Materials and Equipment

- A. Materials and equipment furnished shall be in strict accordance with the specifications and drawings and shall be new and of best grade and quality. When two or more articles of the same material or equipment are required, they shall be of the same manufacturer.
- B. All electrical equipment and wiring shall bear the Underwriters Laboratories, Inc. label where UL labeled items are available, and shall comply with NEC (NFPA-70) and NFPA requirements.

2.2 Reference Standards

- A. Where standards (NFPA, NEC, ASTM, UL, etc.) are referenced in the specifications or on the drawings, the latest edition is to be used except, however, where the

Authority Having Jurisdiction has not yet adopted the latest edition, the edition so recognized shall be used.

2.3 Equipment Selection

- A. The selection of materials and equipment to be furnished shall be governed by the following:
 - 1. Where trade names, brands, or manufacturers of equipment or materials are listed in the specification, the exact equipment listed shall be furnished. Where more than one name is used, the Contractor shall have the option of selecting between any one of the several specified. All products shall be first quality line of manufacturers listed.
 - 2. Where the words "or approved equal" appear after a manufacturer's name, specific approval must be obtained from the Architect during the bidding period in sufficient time to be included in an Addendum. The same shall apply for equipment and materials not named in the specifications, where approval is sought.
 - 3. Where the words "equal to" appear, followed by a manufacturer's name and sometimes a model or series designation, such designation is intended to establish quality level and standard features. Approval of equal equipment by other manufacturers must be obtained per paragraph 2.3.A.2 above.
- B. Before bidding equipment, and again in the preparation of shop drawings, verify that adequate space is available for entry and installation of the item of equipment, including associated accessories. Also verify that adequate space is available for servicing of the equipment and that required NEC clearances are met.
- C. If extensive changes in conduit, equipment layout or electrical wiring and equipment are brought about by the use of equipment which is not compatible with the layout shown on the drawings, necessary changes shall be deemed to be included in this contract.

2.4 Shop Drawings

- A. Electronic copies of shop drawings and descriptive information of equipment and materials shall be furnished. Submit to the Construction Manager for review as stated in the General Conditions and Supplementary Conditions. These shall be submitted as soon as practicable and before equipment is installed and before special equipment is manufactured. Submittal information shall clearly identify the manufacturer, specific model number, approval labels, performance data, electrical characteristics, features, specified options and additional information sufficient to evidence compliance with the Contract Documents. Product catalogs, brochures, etc. submitted without project specific items marked as being submitted for review will be rejected and returned without review. Shop drawings for equipment, fixtures, devices and materials shall be labeled and identified same as on the Contract Documents. If compliance with the above criteria is not provided shop drawings will be subject to rejection and returned without review. Samples shall be submitted when requested or as specified here with-in.

- B. The review of shop drawings by the construction Manager, Architect or Engineer shall not relieve the Contractor from responsibility for errors in the shop drawings. Deviations from specifications and drawing requirements shall be called to the Architect and Engineer's attention in a separate clearly stated notification at the time of submittal for the Architect's and Engineer's review.
- C. Shop drawings of the following equipment and materials shall be submitted:
 - 1. Raceways and boxes for electrical systems including expansion joints.
 - 2. Miscellaneous cabinets.
 - 3. Wiring devices and coverplates.
 - 4. Fire stopping and fire stop assemblies.
 - 5. Surge suppression.
 - 6. Switchboards
 - 7. Labels, markings and tags.
 - 8. Panelboards.
 - 9. Cabinets and enclosures.
 - 10. Fuses.
 - 11. Motor controllers.
 - 12. Grounding and bonding components.
 - 13. Sleeves.
 - 14. Lighting fixtures and lamps.
 - 15. Lighting controls/contactors and photocell.
 - 16. Control Switches.

PART 3 - EXECUTION

3.1 Testing

- A. As each wiring system is completed, it shall be tested for continuity and freedom from grounds.
- B. As each electrically operated system is energized, it shall be tested for function.
- C. On all electric services including change-outs, backfeeds, etc. the Contractor shall verify phase rotation and voltage readings to ensure the final installation is proper. Submit in writing a record of voltage readings and current readings taken at no-load and fully loaded conditions.
- D. The Contractor shall perform megger and resistance tests and special tests on any circuits or equipment when an authorized inspection agency suspects the system's integrity or when requested by the Architect or Engineer.
- E. All signaling and communications systems shall be inspected and tested by a qualified representative of the manufacturer or equipment vendor. Submit four (4) copies of reports indicating results.
- F. Tests shall be witnessed by field representatives of the Architect or Engineer or shall be monitored by a recorder. Furnish a written record of each system test indicating

date, system, test conditions, duration and results of tests. Copies of all test reports shall be included in the O&M manuals.

G. Instruments required for tests shall be furnished by the Contractor.

3.2 Equipment Cleaning

- A. Before placing each system in operation, the equipment shall be thoroughly cleaned; cleaning shall be performed in accordance with equipment manufacturer's recommendations.
- B. Refer to appropriate Sections for cleaning of other equipment and systems for normal operation.

3.3 Operation and Adjustment of Equipment

- A. As each system is put into operation, all items of equipment included therein shall be adjusted to proper working order. This shall include balancing and adjusting voltages and currents; verifying phase rotation; setting breakers, ground fault and other relays, controllers, meters and timers; and adjusting all operating equipment.
- B. Caution: Verify that all bearings of equipment furnished are lubricated, all motors are operating in the right direction, and correct drive settings and overload heater elements are provided on all motors. Do not depend wholly on the other trades judgment in these matters. Follow specific instructions in regard to lubrication of equipment furnished under this Contract.

3.4 Operating Demonstration and Instructions

- A. The Contractor shall set the various systems into operation and demonstrate to the Owner and Construction Manager that the systems function properly and that the requirements of the Contract are fulfilled.
- B. The Contractor shall provide the Owner's representatives with detailed explanations of operation and maintenance of equipment and systems. A thorough review of the operating and maintenance manuals shall be included in these instructional meetings.
- C. A minimum of 8 hours shall be allowed for instructions to personnel selected by the Owner. Instructions shall include not less than the following:
 - 1. Show location of items of equipment and their purpose.
 - 2. Review binder containing instructions and equipment and systems data.
 - 3. Coordinate written and verbal instructions so that each is understood by personnel.
 - 4. Separate instructions shall be given by manufacturer's representatives for the various special and communications systems.
- D. A minimum of 48 hours continuous trouble-free operating time shall be acceptable to prove that the systems function properly.

END OF SECTION

SECTION 26 05 02 AGREEMENT AND WAIVER FOR USE OF ELECTRONIC FILES

PART 1 - GENERAL

- 1.1 The Engineer, at his sole discretion and without obligation, makes graphic portions of the contract documents available for use by the contractor in electronic format. These electronic files are proprietary, and remain the Engineer's Instruments of Service and shall be for use solely with respect to this project, as provided in the Standard Form of Agreement between Architect and Engineer.
- 1.2 Electronic files shall be released only after bids have been received for the project and contracts have been signed with the Contractors.
- 1.3 The Contractor shall acknowledge receipt of electronic files in the requested format for this project. The electronic files are provided as a convenience to the User, for use in preparing shop drawings and/or coordination drawings related to the construction of only the project identified in the Agreement. The electronic files and the information contained within are the property of the Engineer and/or the Architect and/or the Owner, and may not be reproduced or used in any format except in conjunction with the project identified in the Agreement.
- 1.4 The User acknowledges that the information provided in the electronic files is not a substitution or replacement for the Contract Documents and does not become a Contract Document. The User acknowledges that neither the Engineer, the Architect, the Consultants, the Client or the Owner make any warrant or representation that the information contained in the electronic files reflect the Contract Documents in their entirety. The User assumes full responsibility in the use of the electronic files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
- 1.5 The User acknowledges that the receipt of electronic files in no way relieves the User from the responsibility for the preparation of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
- 1.6 Electronic files are available in a .DWG or .RVT format for a cost as indicated in the Agreement and Waiver Form. **Providing the documents in a .DWG version that differs from the product version that the .DWG files were initially created in will incur additional charges per sheet, as indicated in the Agreement and Waiver Form.** Charges are for the Engineer's time to prepare the documents in the format stated. They are available through the Engineer's office on a C.O.D. basis only. A sample of the format will be provided by the Engineer upon request by the contractor, for the purpose of testing the compatibility of the format to the contractor's systems.
- 1.7 All drawings will be in an AutoCAD file format, when requested to be .DWG format.
- 1.8 All project models will be furnished without views.
- 1.9 All electronic files shall be stripped of the Project's name and address, the Architect's and Engineer's and any consultant's name and address, and any professional licenses indicated on the contract documents, (and all dimensions, verbiage, and statistical

information). Use of these electronic files is solely at the contractor's risk, and shall in no way alter the contractor's Contract for Construction.

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

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

- 3.1 Attached "Agreement" shall be submitted with accompanying payment to the Engineer prior to delivery of electronic files.

END OF SECTION



Project: Banks Phase 3B-BP6
Cincinnati, Ohio

Owner: Hamilton County

Heapy Engineering Project Number: 2019-07018

Heapy Engineering Project Manager: Dave Madden

The Provider, named below, will furnish the Recipient, named below, certain documents prepared by the Provider or its sub consultants in an electronic format. These documents are hereinafter collectively referred to as "Electronic Files". The Electronic Files are instruments of the Provider services performed solely for the Owner's benefit and to be used solely for this Project. The Provider does not represent that the information contained in the Electronic Files are suitable for use on any other project or for any other purpose. If the Electronic Files are used for any other project or purpose without the Provider's specific written permission, the risk of such use shall be assumed solely by the Recipient or other user.

Prior to the use of the Electronic Files the Provider and the Recipient agree to the following terms and conditions:

1. The Provider and Recipient fully understand that the data contained in these electronic files are part of the Provider's Instruments of Service. The Provider shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.
2. The Recipient confirms their request to the Provider for Electronic Files for the Project listed above, which the Recipient understands are to be provided only in accordance with, and conditioned upon, the terms and conditions of the Agreement and Waiver for Use of Electronic Files).
3. The Provider agrees that the Recipient may use the Electronic Files for the sole purpose of preparing shop drawings and/or coordination drawings for the above Project only. Any Electronic Files provided are strictly for the use of the Recipient in regard to the Project named above, and shall not be utilized for any other purpose or provided by the Recipient to any entity other than its subcontractors for the Project named above.
4. The Recipient acknowledges that the furnishing of Electronic Files in no way relieves the Recipient from the responsibility of shop drawings or other schedules as set forth in the Contract between the Contractor and the Owner.
5. The Recipient acknowledges:
 - a. That the Electronic Files do not contain all of the information of the Bid Documents or Contract Documents for the construction of the Project above.

- b. That information in the Bid Documents or Contract Documents may be revised or modified in the future.
 - c. The Provider does not have, and will not have, any duty or obligation to advise or give notice to the Recipient of any such revisions or modifications.
 - d. That the Recipient agrees that its use of the Electronic Files is at the Recipient's sole risk of liability, and that the Recipient shall make no claim or demand of any kind against the Provider arising out of Recipient's receipt or use of the Electronic Files.
6. The Provider makes no representation or warranty of any kind, express or implied, with respect to the Electronic Files and specifically makes no warranty that the Electronic Files shall be merchantable or fit for any particular purpose, or accurate or complete. Furthermore, any description of said Electronic Files shall not be deemed to create an implied or express warranty that such Electronic Files shall conform to said description.
7. Due to the unsecured nature of the Electronic Files and the inability of the Provider or the Recipient to establish controls over their use, the Provider assumes no responsibility for any consequences arising out of the use of the data. It is the sole responsibility of the Recipient to check the validity of all information contained within the Electronic Files. The Recipient shall at all times refer to the Construction Documents of the project during all phases of the project. The Recipient shall assume all risks and liabilities resulting from the use of this data, and the Recipient agree(s) to waive any and all claims and liability against the Provider and its sub consultants resulting in any way from the use of the Electronic Files.
8. Electronic Files are provided strictly as a courtesy by the Provider solely for the convenience of the Recipient, and are not part of the Bid Documents or Contract Documents for the Project. The Electronic Files do not replace or supplement the paper copies of any drawings, specifications, or other documents included in the Contract Documents for use on the project.
- a. The Recipient assumes full responsibility in the use of Electronic Files, including the responsibility to see that all manual modifications, addenda, bulletins, clarifications and Change Orders to the drawings executed as a part of the Contract Documents have been incorporated.
9. As stated herein, the possibility exists that the Electronic Files provided may differ from the Bid Documents or Contract Documents for construction of the Project. The Provider shall not be responsible, nor be held responsible, for differences between Electronic Files, the Bid Documents, and Contract Documents. The Bid Documents or Contract Documents for the Project may be modified by the Provider at any time, either before or after construction begins. The Provider has no responsibility, either before or after any such modification, to determine or to advise the Recipient whether any such modification causes Electronic Files provided to the Recipient to be out of date, inconsistent with the Bid Documents or Contract Documents, or otherwise unsuitable or unfit for use in any way.
10. The Recipient assumes all risk and liability for any losses, damages, claims, or expenses (including defense and attorney fees) resulting from its receipt, use, or

possession of Electronic Files furnished by the Provider. The Provider makes no representation, warranty or guarantee that the Electronic Files:

- a. Are suitable for any other usage or purpose.
 - b. Have any particular durability.
 - c. Will not damage or impair the Recipient's computer or software.
 - d. Contain no errors or mechanical flaws or other discrepancies that may render them unsuitable for the purpose intended by the Recipient.
11. Recipient agrees to indemnify, defend and hold harmless the Provider, agents, employees, and the Owner from, and against, any and all claims, suits, losses, damages or costs, of any kind or nature, including attorney's fees, arising from or by reason of the Recipient's use of Electronic Files provided by the Provider, and such defense and indemnification obligation duties shall survive any use under this Agreement and Waiver for Use of Electronic Files.
12. The Recipient agrees that the Provider shall have no responsibility whatsoever for problems of any nature arising from transmitting and storing electronic files at a Recipient requested FTP or project management site or the conversion of the Electronic Files by the Recipient or others for use in non-native applications. The Provider will not provide Electronic Files in compressed formats. Recipient agrees to accept the files in the format provided by the Provider, and that Recipient's conversion or electronic file storage at the Recipient's requested site, shall be at Recipient's sole risk.
13. Recipient acknowledges:
 - a. That the Electronic Files provided by the Provider are a graphical representation of the building in order to generate two-dimensional industry standard drawings.
 - b. That the data contained in the Electronic Files may not be 100% accurate and should not be used for dimensional control, building layout, shop drawings, or any other similar purpose
 - c. That any schedule of materials produced directly from the Electronic Files has not been checked for accuracy.
 - d. That the information in the Electronic Files should be used only for comparative purposes and shall not be relied upon for accurate quantity estimates or used in establishing pricing.
14. Electronic Files provided by the Provider will only contain elements and content that the Provider deems necessary and appropriate to share. No specific Level of Development (LOD) is implied or expected. The Recipient agrees that no proprietary content, MvParts or Revit Families or any other AutoCAD MEP or Revit MEP content shall be removed from the model and/or used for any other purpose but to support this specific project.
15. The Provider, at its sole discretion, may modify the Electronic files before they are provided to the Recipient. Such modifications may include, but are not necessarily

limited to, removal of certain information. The Provider, at its sole discretion, may refuse to provide some or all Electronic Files requested by Recipient.

16. The availability of Electronic Files that were not prepared by the Provider is subject to the consent of the Owner or consultant that prepared those Electronic Files. The Provider will not negotiate with the Owner or consultant or repeatedly solicit the Owner or consultant to obtain such consent. Neither this Agreement and Waiver for Use of Electronic Files nor any such separate Consultant's consent may be assigned or transferred by Recipient to any other person or entity.

Provider (Name of Company): _____

Recipient (Name of Company): _____

Recipient Address: _____

Name of authorized Recipient Representative: _____

Title of authorized Recipient Representative: _____

E-mail address of authorized Recipient Representative: _____

Signature of authorized Recipient Representative: _____

Date: _____

NOTE: Select requested Electronic File Format, File Transfer Medium and complete applicable Cost Summary.

A. Electronic File Format (select one):

1. ☐ .DWG Format - List of Drawings Requested: _____

2. ☐ Revit Project Model Requested (Model only, no Views included)

B. File Transfer Medium (select one):

☐ CD-ROM ☐ DVD-ROM ☐ Heapy FTP ☐ User's FTP site ☐ Flash Drive

C. Delivery of Electronic Files Cost Summary:

Available Electronic .DWG file format:

☐ 20XX DWG

If a different file version is required than the indicated available version state the requested version:

_____ .DWG

Note that an additional charge per sheet will be incurred.

Cost of Preparation of Division 26 Electronic .DWG Files:

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP6 – February 21, 2020
Heapy – 2019-07018

First Drawing: \$50.00 \$50.00

Additional Drawings \$15.00 each _____ x \$15.00 = \$ _____

Conversion to .DWG version different from available .DWG:
\$5.00 additional/sheet x \$ 5.00 = \$ _____

Total Cost: (Please make check payable to Heapy Engineering
and include a copy of this form.) \$ _____

All files will be bound together.

Available electronic Revit file format:

☐ 2018 .RVT

Cost of Preparation of Division 26 Electronic Revit Model Files:

Revit Project Model without Views \$500.00

Total Cost: (Please make check payable to Heapy Engineering
and include a copy of this form.) \$

SECTION 26 05 04 BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 Temporary Electric Services

- A. The temporary service and temporary lighting for construction is provided by the Contractor. Refer to Division 01 - General Requirements.
- B. The Contractor is cautioned to carefully consider the possible sources of temporary electric service and the probable location of the Contractor's office.
- C. The Construction Manager will make application to the local utility company for the temporary electric service but Electrical Contractor will pay for all electric power used during construction, including electric heating.
- D. The Contractor shall furnish, install and pay for all necessary conduit, wire, metering, poles, switches, receptacles, lights and accessories to provide a 400 amp, 120/208 volt, 3 phase, 4 wire temporary electric service with the main disconnect switch, meter, and a 42 circuit load center at a location specified by the Construction Manager.
- E. Consult the utility company for fees required and include same in Electrical Contract.
- F. Labor, receptacles, boxes, fixtures, wire, etc. required by the various Contractors inside their offices shall be paid for by the respective Contractors.
- G. Lighting fixtures shall be placed every 40 ft. along each corridor or where corridors do not occur, along the long axis of all rooms and areas greater than 25 ft. in length. Provide a 200 watt lamp in a rubber coated socket with wire guard, spliced into branch feeder conductor at every 20 ft. The branch circuit wiring may be 3 wire type "NMC" and the wire guard shall be bonded to the ground conductor. Receptacle circuits shall consist of 1 gang handy box with grounded duplex receptacles a maximum of 50 ft. on center with a maximum of 4 per circuit. All receptacle circuits shall be protected by its own overcurrent device in a panelboard. Install wiring and equipment above 6 feet 6 inches and below the finished ceiling. Extend circuits as required and protect in an appropriate panelboard on each floor level. Provide GFCI protected receptacles and circuits as required by NEC and OSHA.
- H. Contractors requiring extension cords shall provide their own cords and plugs up to capacity of 20 amperes. For services to larger items of equipment and welders, this Contractor shall extend proper feeders as requested at the expense of the Contractors requiring the service.
- I. The Contractor shall maintain the temporary light and power system for the duration of the work and shall remove it from the site when directed. Temporary wiring and equipment shall remain the property of the Contractor.
- J. The use of the permanent electrical system for temporary services during the latter stages of construction shall be allowed. Expedite completion of system as practicable to this end. Maintain the system during this period.

- K. Warranty periods on equipment, materials and systems shall commence upon Owner acceptance of the building or systems. Temporary use shall not jeopardize or alter warranty requirements.
- L. The complete temporary service shall comply with Power Company, OSHA, and all Code requirements.

1.2 Continuity of Service

- A. Work shall be so planned and executed as to provide reasonable continuous service of existing systems throughout the construction period. Where necessary to disrupt services for short periods of time for connection, alteration or switch over, the Owner and Construction Manager shall be notified in advance and outages scheduled at the Owner's reasonable convenience.
- B. Submit, on request, a written step-by-step sequence of operations proposed to accomplish the work. The outline must include tentative dates, times of day for disruption, downtime and restoration of services. Submit the outline sufficiently in advance of the proposed work to allow the Architect or Engineer and Construction Manager to review the information with the Owner. Upon approval, final planning and the work shall be done in close coordination with the Owner.
- C. Shutdown of systems and work undertaken during shutdown shall be bid as being done outside of normal working hours.

PART 2 - PRODUCTS

2.1 Access Panels

- A. Provide ceiling and wall access panels where indicated on the drawings, or where otherwise required to gain access to concealed valves, traps, devices and equipment requiring service or adjustment.
- B. Access panels shall be stainless steel construction with concealed hinge and door with tamperproof screws. Panels shall be 18 inches x 18 inches size unless larger panels are shown or required. Mounting frames shall be compatible with the material in which they are installed. Access panels shall be:
 - 1. Standard flush type with overlapping flange for masonry and tile walls, Milcor Style "M" or equal.
 - 2. Standard flush type for drywall ceilings and walls, Milcor Style "M" or equal.
- C. Access panels in fire rated shaft walls and in fire rated ceilings shall be "B" label or greater to match the rating of the wall or ceiling.
- D. Materials used in plenums shall be rated for plenum use conforming to the ASTM E84 25/50 smoke development and flame spread restrictions.

PART 3 - EXECUTION

3.1 Workmanship

- A. Materials and equipment shall be installed and supported in a first-class and workmanlike manner by mechanics skilled in their particular trades. Workmanship shall be first-class in all respects, and the Architect shall have the right to stop the work if highest quality workmanship is not maintained.
- B. Electrical work shall be performed by a licensed Electrical Contractor in accordance with requirements of the jurisdiction.

3.2 Protection

- A. The Contractor shall be entirely responsible for all material and equipment furnished in connection with his work. Special care shall be taken to properly protect all parts thereof from theft, damage or deterioration during the entire construction period in such a manner as may be necessary, or as directed by the Architect, or Construction Manager.
- B. The Owner's property and the property of other contractors shall be scrupulously respected at all times. Provide drop cloths and visqueen or similar barriers where dust and debris is generated, to protect adjacent areas.

3.3 Cutting and Patching

- A. Refer to Division 01 - General Requirements for information regarding cutting and patching.
- B. Plan the work well ahead of the general construction. Where conduits, wireways, cable trays and bus ducts are to pass thru walls, partitions, floors, roof or ceilings, place sleeves in these elements or arrange with the Construction Manager to provide openings where sleeves are not practical. Where sleeves or openings have not been installed, sawcut or core drill holes and patch as required for the installation of this work, or pay other trades for doing this work when so directed by the Architect. Any damage caused to the building in this work shall be repaired or rectified.
- C. All sleeves and openings not used or partially used shall be closed to prevent passage of smoke and fire.

3.4 Painting

- A. In addition to any painting specified for various individual items of equipment, the following painting shall be included in Division 26 Electrical Contract:
 - 1. Ferrous metal which is not factory or shop painted or galvanized and which remains exposed to view shall be given a prime coat of paint and two finish coats of paint.
 - 2. Ferrous metal installed outside the building which is not factory or shop painted or galvanized shall be given a prime coat of paint and two finish coats of paint.

3. Equipment and materials which have been factory or shop coated (prime or finished painted or galvanized), on which the finish has been damaged or has deteriorated, shall be cleaned and refinished equal to its original condition. The entire surface shall be repainted if a uniform appearance cannot be accomplished by touch up.
 4. Apply Z.R.C. Galvilite or Galvicon cold galvanizing compound, or Engineer approved equal, for touch-up and repair of previously galvanized surfaces.
 5. Each backboard shall be painted with a minimum of two coats of flame retardant paint, all sides; gray enamel primer with gray matte enamel finish.
- B. Paint, surface preparation and application shall conform to applicable portions of the Painting Section of Division 09 of the Specifications. All rust must be removed before application of paint.
- C. Finish painting is included as described in Division 01 Trade Contractor Descriptions.

3.5 Access Panels

- A. Access panels shall be turned over to the Construction Manager for installation.
- B. Access locations thru HVAC ductwork must be coordinated with the ductwork installer. Location of the hinged access door with latch must be coordinated in advance with the HVAC Contractor.
- C. Location of access panels shall be planned to clear ceiling lights, ceiling support grids and other obstructions so as to allow, wherever possible, full shoulder clearance beside the device to be inspected, adjusted or repaired.

3.6 Backboards

- A. Where shown on the drawings, backboards shall be provided for wall mounting of disconnect switches, devices and communications equipment. The Contractor may opt to mount additional groups of disconnect switches on backboards.
- B. General
1. Backboard shall be 0.75 inch thick waterproof flame retardant plywood secured to structure.
 2. Each board shall be painted.
 3. Telephone backboards shall be normally 4 ft. x 8 ft. mounted 6 inches above floor where located on drawings. Where other sizes are required, they will be noted on the drawings.
- C. Each terminal cabinet for communication systems, relays, etc., shall be fitted with a full size 0.50 inch thick backboard for mounting terminal strips, equipment, etc.

END OF SECTION

SECTION 26 05 05 FIRESTOPPING

PART 1 - GENERAL

- 1.1 Firestopping assemblies shall be provided at penetrations of conduits, bus ducts, cables, cable trays and other electrical items thru fire rated floors, fire rated floor-ceiling and roof ceiling assemblies, fire rated walls and partitions and fire rated shaft walls and partitions. In addition, firestopping assemblies shall be provided at penetrations thru 0-hour rated floors. Refer to the drawings for fire rated building elements.
- 1.2 Firestopping assemblies shall be tested and rated in accordance with ASTM E814, E119 and listed in accordance with UL 1479, as published in the UL Fire Resistance Directory. Firestopping shall provide a fire rating equal to that of the construction being penetrated.
- 1.3 Firestopping materials, assemblies and installation shall conform to requirements of the OBC / Chapter 1, Section 106 and Chapter 7, Section 712 and the Authority Having Jurisdiction.
- 1.4 For those firestopping applications that exist for which no UL tested system is available through any manufacturer, a manufacturer's engineering judgment derived from similar UL system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.
- 1.5 Shop drawings shall be prepared and submitted for review and approval. Submittals shall include manufacturer's specifications and technical data of each material, documentation of U.L. firestopping assemblies and installation instructions. Submittals shall include all information required in OBC Chapter 1, Section 106 and Chapter 7, Section 712.

PART 2 - PRODUCTS

- 2.1 Firestopping materials shall be manufactured and/or supplied by Hilti, 3M, Rectorseal-Metacaulk, Tremco, Nelson, Specified Technologies or other approved manufacturer.
- 2.2 Materials shall be in the form of caulk, putty, sealant, intumescent material, wrap strip, fire blocking, ceramic wool and other materials required for the UL listed assemblies. These shall be installed in conjunction with sleeves and materials for fill and damming.
- 2.3 Combination pre-set floor sleeve and firestopping assemblies shall be equal to Hilti CP 680.

PART 3 - EXECUTION

- 3.1 Installation of all materials and assemblies shall be in accordance with UL assembly drawings and the manufacturer's instructions.
- 3.2 Installation shall be done by an experienced installer who is certified, licensed or otherwise qualified by the firestopping manufacturer as having the necessary training and experience.

- 3.3 Refer to 26 05 33 Raceway and Boxes for Electrical Systems for sleeve requirements and treatment of penetrations not requiring firestopping.

END OF SECTION

SECTION 26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS

PART 1 - GENERAL

1.1 This Section pertains to the use of copper conductors, 600V insulation class.

PART 2 - PRODUCTS

2.1 All conductors shall be copper: conductors shall be insulated for 600 volts.

2.2 Insulation types referenced are those of NEC. All conductors shall be UL labeled and shall be marked for size and type at regular intervals on its length. Conductors #8 and larger shall be stranded; #10 and smaller may be stranded provided approved terminations are used.

2.3 Types of conductor insulation for general use may be any of the following, subject to limitations listed, in addition to those in the NEC:

- A. Type THHN - restrictions - do not use for conductors in slab. Do not use in wet locations.
- B. Type THWN - no restrictions.
- C. Type XHHW - no restrictions.

2.4 Use Type THHN or XHHW, (90 degrees C. rated) types for connecting fluorescent fixtures and for running thru fixture housings.

2.5 Use conductors such as type FEP with high temperature insulation as identified in the NEC for connections to resistance heating elements or in other areas subject to temperature exceeding the rating of THWN, XHHW or THHN.

2.6 Color Coding – The use of colored commercial building wire is encouraged.

- A. On 208/120 volt, three phase and 240/120 volt, single phase grounded systems, wires colored black, red and blue shall be used for phase conductors. Neutral wires on these systems shall be white. If conductors No. 4 AWG or larger are not available in white or white stripes, the neutral may be a black wire identified with white tape, minimum size 0.50 inch wrapped twice around at the following points:
 - 1. At each terminal.
 - 2. At each conduit entrance.
 - 3. At intervals not more than 12 inches apart in all accessible enclosures.
- B. On 480/277 volt, three phase system, wires colored brown, orange and yellow shall be used for phase conductors. Neutral wires on these systems shall be gray or other NEC acceptable means for distinguishing each system grounded conductor from another. If conductors No. 4 AWG or larger are not available in the proper colors, black wire may be used with 0.50 inch tape bands of the proper color at the following points:
 - 1. At each terminal.

2. At each conduit entrance.
 3. At intervals not more than 12 inches apart in all accessible enclosures.
 - C. Equipment grounding conductors shall be green, or for 4 AWG and larger may be completely taped green, at all accessible points.
 - D. All control circuits shall be red with individual wire identification on each conductor.
 - E. Where existing wiring systems (remodel work or building additions) have different color coding, consult the Engineer concerning matching existing wire color coding and phasing.
- 2.7 Wire size ampacity shall equal or exceed its overload protective device. Where wire sizes shown on the drawings are greater than the apparent ampacity requirements, the size shown shall prevail to compensate for voltage drop. In no instance shall conductors be installed that are less than required by N.E.C. Minimum conductor size shall be No. 12 AWG except No. 14 AWG may be used only for control wiring or where otherwise specifically shown.
- 2.8 When necessary to use a lubricant for pulling wires, lubricant must be listed by Underwriters' Laboratories, Inc. Only cable lubricants approved for the type of jacket material or insulation shall be used, and must be of such consistency that it will dry completely when exposed to air. Lubricant must leave no obstruction or tackiness that will prevent pulling out old wires or pulling in new wires or additional wires, and, after drying, must leave a film of lubrication which will promote easy movement of the wires. The lubricant shall contain no waxes, greases, silicones, or polyalkylene glycol oils or waxes. Lubricant shall be Ideal "Yellow 190", 3M "WL" Wire Pulling Lubricant, or approved equal.
- 2.9 Splices No. 10 AWG and smaller shall be made using the following:
- A. Preinsulated spring pressure connectors as follows: ITT Holub "Freespring", with metal grip threads 3M "Scotch-Lok", Ideal "Wingnut", Thomas and Betts Type "PT", or Buchanan "B Cap". Other hard insulated wire connectors which have bakelite or ceramic insulation are prohibited. (Non-metallic thread connectors shall not be used.)
- 2.10 Splices No. 8 AWG and larger shall be made using the following:
- A. Approved crimp type connectors with special crimping tool; T&B, Burndy, Buchanan or approved equal. Joints and free ends shall be covered with tape or approved moistureproof insulating kits. Applied insulation shall exceed 150 percent of conductor insulation voltage rating.
 - B. For two or more taps use Power Distribution Blocks by Square D, Gould, Taylor, IlSCO or Connectron.
- 2.11 Wiring in vertical raceways shall be supported with strain relief devices; Kellem's grips or approved equal.
- 2.12 Connections to equipment shall be made with pressure type terminals. On stranded wire, use spade type terminals or terminals approved for use with stranded wire. Connections shall contain only single conductors unless approved for multiples.

- A. For conductors No. 10 AWG and smaller, applied crimp type terminals shall be T&B "Sta Kon" or approved equal.
 - B. For No. 8 AWG and larger conductors, applied crimp type terminals shall be Burndy, T&B or approved equal.
- 2.13 Where tape is applied over wires and connectors on 600 volt or lower voltage applications, it shall consist of a minimum of two (2) half lapped layers of Scotch "88" or Plymouth No. 4240 for both indoor and outdoor applications, except Scotch 33 Plus or Plymouth No. 4453 is acceptable for use indoors.
- 2.14 Where fireproofing of cables is noted on the drawings or required by Code, each cable shall be arc and fireproofed with one (1) half lapped layer of Scotch Brand 77 Electric Arc and Fireproofing Tape. Tape shall be secured with a 2 layer band of Scotch Brand 69 Glass Electrical Tape over the last wrap. Installation shall comply with manufacturer's recommendation.
- 2.15 Where installed underground, splices and terminations shall be listed and approved for waterproof application. Utilize kits approved for the application.

PART 3 - EXECUTION

- 3.1 Branch circuit conductor identification means shall be permanently posted at each panelboard and switchboard. This identification shall be installed on the inside of the door and shall identify conductor colors for each voltage system in the building. Provide identification at all new panelboards and existing panelboards utilized within this project.
- 3.2 Conduit systems shall be clear and clean before pulling wire. Branch circuit conductors shall be pulled without resorting to levers or heavy pulling devices.
- 3.3 Cable pulling tensions shall not exceed recommended values.
- 3.4 Group ungrounded and grounded circuit conductors for each multiwire branch circuit by cable ties in panelboards and tap boxes.
- 3.5 Each branch circuit or multiwire branch circuit shall have its own dedicated neutral. Group neutral conductors with phase conductors by wire ties in each enclosure where multiple neutrals provided.
- 3.6 Control conductors shall not be run in same raceway with branch circuit or motor circuit conductors.
- 3.7 Unless noted otherwise on the drawings, a maximum of 8 conductors shall be installed in a branch circuit conduit. This maximum is a count of all phase and neutral conductors only, ground conductors are not counted when determining maximum fill for this purpose.
- 3.8 Wire tags shall be provided on all main and feeder conductors in all pull boxes, wireways and panelboard and switchboard wiring gutters. Tags shall identify wire or cable number and/or equipment served. Tags shall be of flame resisting adhesive material, T&B Type WSL or approved equal.

- 3.9 Perform meggar tests on all feeders and motor branch circuit conductors prior to energization of circuits. Provide documentation in standard NETA format to the Engineer for review. Do not run meggar check on solid state equipment.

END OF SECTION

SECTION 26 05 26 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

- 1.1 Work includes grounding and bonding of system neutral, equipment and conduit systems to conform to requirements of NEC and as detailed on the plans and in the specifications.

PART 2 - PRODUCTS

- 2.1 Grounding rods shall be copper clad, molten-welded copper to steel; unless otherwise designated, 0.625 inch diameter x 10 ft. long.
- 2.2 Clamps and continuity devices shall be non-ferrous material, UL approved. Connections to ground rods and all underground connections shall be "Thermoweld" or "Cadweld" or Engineer approved equal.
- 2.3 Ground conductors shall be insulated, identified by green insulation or by painting or taping green at all accessible locations and shall be connected with approved connectors and terminators to boxes, devices, equipment, etc. and to ground bars in panels.
- 2.4 The new utility pad grounding shall be tied to the existing grounding loop provided in an earlier phase.
- 2.5 The new service entrance grounding shall be tied to the existing grounding loop provided in an earlier phase.

PART 3 - EXECUTION

- 3.1 Provide a listed intersystem bonding termination system with capacity for a minimum of 5 - #6 bonding conductor terminations. Locate external to the service entrance equipment and connect to the grounding electrode system.
- 3.2 Wiring devices shall be connected with grounding jumper from ground pole on device to grounding screw in the outlet box.
- 3.3 Grounding Bus:
 - A. Bus shall be minimum 3/8 inch x 2 inches x 12 inches L. solid copper.
 - B. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
 - C. The grounding bars shall be bonded to the building grounding mat and the building ground loop.
- 3.4 The complete metal conduit system shall be used for the equipment grounding system. Conduit systems and associated fittings and terminations shall be made mechanically tight to provide a continuous electrical path to ground and shall be safely grounded at all equipment by bonding all metallic conduit to the equipment enclosures with locknuts cutting thru paint or enclosures. Bond all conduits entering emergency generator control panel and main breaker panel, and secondary service entrance switchboard with a ground wire connecting the grounding type bushings to the equipment ground bar. Conductors

- shall be sized per NEC Tables 250.66, 250.102 and 250.122. Bond all communications conduit systems to ground.
- 3.5 Ground neutral of all transformers for separately derived systems. Grounding electrode conductor shall be to the street side of the main water service, a bond ground ran to nearest water piping and structural steel in area or to other NEC approved electrodes. A common grounding electrode size #3/0 may be used for multiple separately derived systems.
 - 3.6 Motor frames shall be bonded to the equipment grounding system by an independent green wire, sized to match equipment grounding conductor.
 - 3.7 Cord connected appliance frames shall be grounded to the equipment grounding system thru a green wire in the cord.
 - 3.8 Equipment mounted on vibration isolation hanger and supports shall be bonded so bond does not transmit vibration. Size bond to match equipment ground conductor.
 - 3.9 A green grounding conductor shall be installed in each non-metallic conduit and all flexible conduits, including exterior underground conduits.
 - 3.10 System neutral connections shall be insulated from metal enclosures except at the neutral of the service entrance equipment and on the neutral of a separately derived system. Connections to the main switchgear enclosure shall be by means of bonding jumpers.
 - 3.11 The building neutral shall be identified throughout with white conductors. Where there are neutral conductors from a separately derived system (such as 120/208 volt, 3 phase, 4 wire where the main building service is 277/480 volt, 3 phase, 4 wire) the neutrals of the two systems shall be separately identifiable per NEC Article 200.
 - 3.12 Steel frame buildings and metal exterior coverings on buildings that are not effectively grounded shall be grounded thru a low resistance grounding system whether or not a lightning protection system is required. Ground metal exterior coverings and metal roofs with minimum #4 copper conductor at a minimum of two points, intervals not exceeding 100 feet. Ground steel frame buildings at each corner with maximum of every 60 ft. around the outside perimeter by cadwelding #2/0 (#4/0 for buildings over 75 ft. tall) copper conductor to steel columns and extending below ground to driven ground rods; top of 0.625 inch x 10 ft. ground rod shall be minimum of 12 inches below finished grade and 3 ft. out from building foundation. Bond the water service, street side of water meter, to the adjacent perimeter steel column with #4/0 insulated copper conductor. Sleeve all concrete foundations and masonry walls with PVC sleeve.
 - 3.13 Where metal covers on pull boxes and junction boxes are used, they shall comply with the grounding and bonding requirements of NEC Article 250.
 - 3.14 Connections to driven ground rods or other such electrodes shall be a minimum of three feet from the foundation wall or beyond the roof drip line, whichever is greater.
 - 3.15 The electrodes (driven ground rods) of the electrical grounding system shall not be used for the electrodes for the lightning protection system, and vice versa. However, these two systems shall be bonded together at one point per NEC.

- 3.16 Provide sign at normal service “WARNING – SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCES(S) IS ENERGIZED”.

END OF SECTION

SECTION 26 05 33 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

- 1.1 This specification section covers common conduit systems, boxes, firestopping and sleeves. Where other methods are specified under separate sections for specific applications, the specific application requirements shall govern.
- 1.2 Refer to Section 26 05 05 Firestopping and Division 07 for firestopping requirements.
- 1.3 Refer to Section 26 05 28 Communication System Pathways and Support Equipment for future communication system.

PART 2 - PRODUCTS

2.1 Conduit Type - Application (Use only conduit types listed)

- A. Conduit - Rigid or Intermediate Grade Galvanized Threaded.
Application - restrictions - (Not to be used in):
 1. Direct buried in corrosive soils.
 2. Corrosive atmospheres.
- B. Conduit - Thinwall EMT.
Application - restrictions - (Not to be used in):
 1. Poured concrete.
 2. Exposed to weather.
 3. Underground.
 4. Exposed in mechanical equipment or other equipment/process rooms below 48 inches.
 5. Hazardous or corrosive atmospheres.
 6. Not to be used for medium voltage (2001 volts or higher) cable.
 7. Not to be used in areas exposed to the public.
- C. Conduit - PVC Type 40 (Schedule 40) rigid, conforming to ANSI, NEMA specifications and each length UL labeled.
Application - use limited to:
 1. In or under concrete slabs on grade where permitted by electric legend on the drawings.
 2. Exterior use when encased in 3 inch concrete.
 3. Direct buried, underground when indicated on drawings.
- D. Conduit - PVC, NEMA Type TC 6, rigid, conforming to ANSI, NEMA specifications and each length UL labeled.
Application - use limited to:
 1. Exterior use when encased in 3 inch concrete, for duct bank use only.
- E. Conduit - Flexible Metal (Greenfield type), galvanized steel or aluminum.
Application - use limited to:

1. Connection to lighting fixtures; not over 6 ft. in length.
2. Connections to transformers, dynamic equipment and motors only in air streams or plenums.

F. Conduit - Liquidtight Flexible Metal.

Application - use and limitations:

1. Connections to all motors, except in air stream or plenum.
2. Connections to controls on dynamic equipment, transformers, etc., outdoors and indoors in wet locations.
3. Use not permitted underground or where subject to physical damage.

2.2 Conduit sizes

- A. Conduits shall be 0.75 inch minimum size except 0.50 inch size may be used for switch legs and flexible connections to lighting fixtures.

2.3 Conduit Fittings

- A. Fittings and workmanship shall ensure electrical continuity. All conduit systems in poured concrete shall be concrete tight.
- B. Application of bushings, locknuts and insulated fittings shall comply with NEC requirements.
- C. Use conduit fittings as manufactured by Efcor, Steel City, Raco, Midwest, Appleton, ETP / O-Z / Gedney, American Fitting Corporation or T&B, equal to the following catalog numbers:
1. Rigid and intermediate conduit
 - all fittings, couplings and connectors shall be threaded type.
 - grounding bushings, malleable iron; insulated; Steel City BG-801; Midwest Series GLL.
 2. EMT
 - fittings shall be all steel, set screw or compression type, concrete tight.
 - set-screw type couplings; Midwest Series 460; Steel City TK 121; Appleton TW 50S.
 - compression type couplings; Midwest series 660S; Steel City TK111; Appleton TWC50CS.
 - set-screw type connectors; Midwest Series 450; Steel City TC 121; Appleton TWC 50S.
 - compression type connectors; Midwest Series 650; Steel City TC111; Appleton TW50CS.
 3. Flexible metal conduit
 - malleable iron, "squeeze" type, non-insulated; Midwest series 1708; Steel City XC 901; Appleton 7481V. (For lighting fixture whips only - all steel or die cast screw in connector; Midwest 771; Steel City XC 241; Appleton SGC 50DC).
 4. Liquid tight conduit
 - steel or malleable iron; Midwest Series LT; Steel City LT 100; Appleton ST.

- D. All conduit straps and supports in open garage area shall be galvanized steel and designed for use in damp locations.

2.4 Boxes

- A. Junction boxes and pull boxes shall be code gauge galvanized steel with multiple screw fasteners and galvanized steel covers. All boxes in the garage area shall be water tight to prevent moisture damage.
- B. Outlet boxes all steel construction with galvanized or plated finish or otherwise all metal, by Steel City, Appleton, Crouse Hinds, R&S or Racor.
 - 1. Lighting fixture outlet boxes 4 inches square or octagonal, 2.125 inches deep, with 0.375 inch fixture studs. Equal to Steel City Series 54171; Series 52171 with FE 421 stud. Fixtures weighing more than 50 lbs. shall be supported independently of the outlet box.
 - 2. Flush mounted device outlet boxes shall be minimum 4 inches square. Provide extension rings as required. Use Erico Caddy No. H2-3 mounting support plate where metal studs are used.
 - 3. Device rings in finished masonry or tile walls shall be square corner masonry type with no extended ears, to allow flush mounting of plates.
 - 4. Surface mounted device boxes shall be cast "FS" type or special surface mounted boxes for use with surface raceway systems.
- C. Provide water tight boxes, slip expansions and bonding jumpers where dictated by construction conditions.
- D. Terminations at boxes shall be secured by locknuts or approved bushings.
- E. All boxes in the garage area shall be water tight to prevent moisture damage.

2.5 Surface Metal Raceways

- A. Snap on cover types by Mono-Systems, Panduit or Wiremold / Walkermold with prime gray finish (enamel finish coat to match room finishes in remodel areas). Application - permitted only when specifically shown on the drawings.
 - 1. Fittings, boxes and extension rings: Furnish manufacturer's standard accessories; match finish of raceway.

2.6 Sleeves and Openings

- A. Sleeves and formed openings shall be placed in walls, partitions, floor slabs and poured concrete roof decks for the passage of conduit, cable, wireway, cable tray and bus duct. Sleeves and formed openings are not required:
 - 1. In floor slabs on grade.
 - 2. Where conduit is installed before the wall, partition or slab is constructed.
 - 3. Openings are cut for conduit passage and patched with equal or comparable material to close the space around the conduit.
 - 4. In stud and gypsum board or plaster walls and partitions which are not fire rated.

5. For conduit passing thru masonry walls and partitions and stud and gypsum board or plaster walls and partitions. Sleeves are required however, for which expansion, contraction and other movement can be expected.
 6. In core drilled openings in solid concrete not requiring water protection. Sleeves are required, however, at core drilling thru hollow pre-cast slabs and concrete block walls, to facilitate containment of required firestopping material.
 7. In large floor openings for multiple pipe and duct risers which are within a fire rated shaft, unless the opening is to be closed off with concrete or other material after conduits are set.
 8. Sleeves for passage of conduit and cables shall be schedule 40 galvanized steel pipe or galvanized rigid conduit. Rectangular sleeves for cables, wireway, cable tray and bus duct shall be 18 gauge galvanized steel in poured concrete floors, walls and roof decks; 26 gauge galvanized sheet steel in other than poured concrete.
 9. Sleeves shall be sized to afford 0.25 inch to 0.75 inch clearance space.
 10. All other sleeves : schedule 40 PVC, Type 1, ASTM D2466, Color Gray.
- 2.7 Escutcheon plates shall be split-ring chromium plated pressed steel. Plates shall be sized to cover the surface penetration and sleeve. Plates shall be installed on exposed piping in finished rooms and areas where conduits penetrate walls, floors, ceilings or overhead structure.
- 2.8 Anchors and Fasteners
- A. Anchors and fasteners shall be of a type designed and intended for use in the base material to which the material support is to be attached and shall be capable of supporting the intended load and withstanding any associated stresses and vibrations.
 - B. In general, screws shall be used in wood, masonry anchors on concrete or brick, toggle bolts in hollow walls, and machine screws, bolts or welded studs on steel.
 - C. In outdoor locations or garage and any other corrosive atmospheres, the anchors and fasteners shall be non-corrosive or have suitable corrosion resisting coatings.

PART 3 - EXECUTION

- 3.1 All conduit shall parallel building lines.
- 3.2 Conduits exposed in the parking garage or to the public shall be rigid or intermediate rigid type conduits. No EMT conduits shall be installed in any public areas.
- 3.3 Where feeders are permitted to be run below grade slab on grade, they shall be installed in non-metallic conduit encased in 3 inch concrete using galvanized rigid steel or RTRC (equal to Champion Fiberglass) elbows with all necessary fittings and couplers. (NOTE: Where not required to be run overhead, branch circuits may be installed in 1 inch or smaller Schedule 40 PVC conduit below the vapor barrier, shall have a minimum of 6-inch fill over the conduit below the vapor barrier without concrete encasing the PVC. This PVC conduit shall not stub up more than 18 inches above the finished floor and shall be concealed in walls. The 90 degree elbow and stub up shall be galvanized rigid steel).

- 3.4 All conduits installed below concrete slab on grade shall have a minimum of 6-inches fill over the conduits in order to prevent accidental damage to conduits should the floor be saw-cut in the future.
- 3.5 Conduit crossing building expansion joints shall have expansion provisions with grounding continuity; use special expansion fittings or other NEC approved method. Refer to the Architectural and Structural floor plans and details for locations of expansion joints.
- 3.6 Do not install wall-mounted boxes back-to-back in opposite sides of wall; in stud walls, boxes shall be on opposite side of studs. In acoustic rated and fire rated walls boxes shall be separated a minimum of 24 inches.
- 3.7 Boxes not otherwise accessible in ceilings and walls shall be made accessible by installation of hinged door access panels. Refer to Section 26 05 04 - Basic Electrical Materials and Methods.
- 3.8 Work shall be so planned as to:
 - A. Minimize the number of offsets and junction boxes. For feeder conduits, use all long radius conduit bends or accessibly located large junction boxes with screw covers.
 - B. Generally run conduit and conductors as high as practicable against underside of floor slab in concrete construction or immediately below the top chord of bar joist construction unless otherwise shown. This high level zone shall be used for running electrical raceways. Running conduits promiscuously at various levels and directions will not be acceptable. Runs at bottom chord level or ceiling grid level will not be acceptable.
 - C. Where spray on fireproofing is used, coordinate with the General Contractor about installing supports, panel feeders and larger conduits before fireproofing is applied. Branch circuit conduits and smaller size conduits may be run as high as possible on stud walls that go all the way up to the structure; this will minimize damage to spray on fireproofing. Patch and repair damaged spray on fireproofing caused by electrical installation; conduits shall not be fully covered with fireproofing.
 - D. Coordinate activity in advance to avoid interference with other trades.
 - E. Provide access to all junction and pull boxes.
 - F. Maintain 6 inches from conduit to paralleled hot water piping and 4 inches from cross piping and 12 inches from generator exhaust piping.
- 3.9 Secure feeder conduit to basic structural elements with galvanized strap hangers and clamps; use of trapeze type hangers is encouraged for multiple conduits where space will permit. Galvanized metal clamps and screws may be used for attaching and supporting branch circuit conduit. Non-metallic fasteners shall not be used except plastic inserts may be used in concrete for small conduits. Vertical conduits shall be supported at each floor by clamps.
- 3.10 Surface mounted horizontal and vertical conduit supports on walls up to a height of 7 feet-0 inches above the floor shall be one or two hole sheet metal pipe straps. Pinch type

hangers similar to Minerallac type may only be used at heights greater than 8 feet-0 inches. The use of pinch type hangers similar to Minerallac type are expressly prohibited on ductwork, air handling units and other mechanical equipment below 8 feet-0 inches.

- 3.11 During construction temporarily cap open ends of conduit. Caution trades to take special care of runs in concrete slabs during pouring.
- 3.12 Empty conduit installed for communications use or for future systems shall have an insulated pull wire or heavy nylon cord inserted for use in pulling wires.
- 3.13 Pull mandrel or large swab thru conduit to ensure freedom from debris before pulling wires. Use pulling lubricants sparingly.
- 3.14 Sleeves for passage of conduit, cables, wireway, cable tray and bus duct shall be placed in the initial stages of construction before concrete, masonry and other general construction activity. Means shall be taken to ensure that the sleeve will not move during or after construction. Beams, columns and other structural members shall not be sleeved except upon approval of the Architect.
- 3.15 Length of wall sleeves shall be such that the sleeve ends are substantially flush with both sides of the wall or partition. Floor sleeves shall be flush with the bottom and top of the floor slab except, in mechanical rooms and other areas which might have water on the floor, sleeves shall project a minimum of 1 inch above finished floor. Refer to the following paragraph for qualifications and exceptions relating to firestopping.
- 3.16 Refer to 26 05 05 Firestopping. Sleeves which are a part of firestopping assemblies shall conform to the requirements of the assembly with particular emphasis regarding size, annular space, length, passage or non-passage of insulation and the installation of the sleeves.
- 3.17 Where firestopping is not required, the annular space between the sleeve, core drilling or opening and the conduit, cable, cable tray, bus duct and raceway shall be closed with caulking to retard the passage of smoke.
- 3.18 Where permitted by OBC Section 712 Penetrations, metallic conduits requiring no pipe sleeves in passing thru concrete floors or concrete or masonry walls and partitions, the annular space shall be closed full depth of the penetration with materials and methods compatible with the floor, wall or partition material (concrete, grout or mortar).
- 3.19 Conduits, wire and cables entering from outside the building or bath tub planting areas shall be sealed water and moisture tight. Seal between conduit and sleeves, conduits and core drilled holes and around conductors inside conduits.
- 3.20 Power actuated fasteners of any type are prohibited in occupied buildings. This includes anchors which are driven into place by any device which produces an impact force by use of a powder charge, compressed air, gas or any other propellant.
- 3.21 Provide four (4) 1 inch diameter spare conduits for each flush mounted branch circuit panelboard; extend from top of panelboard to above an accessible ceiling for future use.

- 3.22 All conduit terminations to be equipped with locknuts and bushings. Conduits 1-1/2 inches and larger shall have insulating bushings, grounding lug and shall have locknuts inside and outside the enclosure.
- 3.23 Outlet Box Installation
- A. Set box square and true with finished building surfaces and trim.
 - B. Secure boxes firmly to building structure.
 - C. Locate light switches on latch side of door and verify door hinge location in field prior to switch outlet installation.
 - D. The Owner reserves the right to relocate any device as much as 10 feet-0 inches (measured horizontally) from its indicated location at no additional cost, provided the contractor is notified prior to roughing that device in.
- 3.24 Contractor shall record carefully on a set of "as built" prints the exact location of all feeder conduits.
- 3.25 Unless noted otherwise on the drawings, a maximum of 8 conductors shall be installed in a branch circuit conduit. This maximum is a count of all phase and neutral conductors only - ground conductors are not counted when determining maximum fill for this purpose.

END OF SECTION

SECTION 26 05 53 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 Equipment Identification

- A. Identify all the following items with laminated plates:
 - 1. Every motor, lighting and equipment controller and disconnect switch.
 - 2. Transformers.
- B. Nameplate on motor controllers, disconnect switches and transformers shall indicate source, voltage disconnect location, and load served.
- C. Equipment on the emergency systems shall be identified with nameplates having a red background. Outlets on the emergency systems shall be identified red. This shall be accomplished by using red devices.
- D. Branch circuit panelboards:
 - 1. Identify panel designation on directory card within the panel.
 - 2. Fill out branch circuit directory indicating circuit number and area served, rooms, group of rooms, lighting, convenience outlets, motors, etc. Card index shall be neatly typed.
 - 3. Update or replace branch circuit directory in existing panelboards in areas of alteration.
 - 4. Branch circuit phase conductor color format shall be permanently identified inside each panelboard.
- E. Wire identification:
 - 1. Identify communications and signaling system wiring and branch circuit wiring by circuit number in panels and motor control center wiring gutters by means of permanent durable wire markers wrapped around or fastened to conductors. This shall be done concurrently with pulling of conductors.
 - 2. Wiring or fiber cabling installed by Contractor for termination by Owner's vendor such as for telephone or data systems shall be identified at both ends utilizing the alpha/numerical identification schedule established by the system vendor.

PART 2 - PRODUCTS

2.1 Nameplates

- A. Nameplates shall be laminated phenolic with black surface (red surface for emergency) and white core. Use 0.0625 inch thick material for plates up to 2 inches x 4 inches and 0.125 inch thick for larger sizes. The lettering shall be Condensed Gothic with space between the lines equal to the width of the letters. Use 0.25 inch minimum height letters on the small plates increasing the size proportionately to plate size.
- B. The lettering on the plate shall indicate the name of equipment, the specific unit number, voltage, phases, which panel, switchboard or motor control center the

equipment is served from, and any other reference data pertinent to the operation. Names and numbers shall coincide with those listed on the drawings. Sample: Panel 3A; 277/480 V, 3 phase, 4 wire, served from unit substation USI.

PART 3 - EXECUTION

3.1 Nameplates shall be secured with screws, one on each end.

END OF SECTION

SECTION 26 05 65 SPECIFIC WIRING APPLICATIONS

PART 1 - GENERAL

- 1.1 Specific wiring applications are identified. Refer to applicable sections of the specifications.

PART 2 - PRODUCTS

- 2.1 Materials and equipment shall be as indicated on the drawings and in the specifications.

PART 3 - EXECUTION

- 3.1 Final connections to fixture pigtails shall be made with approved pressure connectors such as 3M "Scotchlok" or Engineer Approved equals.

3.2 Miscellaneous Wiring and Interlocks

- A. Various items of work in connection with interlocking motor and starter operations and providing wiring to serve equipment which is furnished by other trades.
- B. Interlocks between motor controllers for purposes of accomplishing sequence control or simultaneous operation of motors are all to be included by the Contractor. Requirements for a simple simultaneous motor operation interlock are indicated by a schedule on the drawings. These interlocks consist of auxiliary contacts on the starter of the lead motor wired in, according to standard diagrams of the motor starter manufacturer to energize the holding coil of the starter for the motor. These interlocks shall be thru the "automatic" position only of the starter where HOA switches are supplied. Where interlocks, other than the simple sequence above are required, these shall be as described hereinafter. This Contractor shall inquire of the Engineer during bidding, or at the earliest practical date, regarding any questions which may arise regarding the intention and scope of this work. This Contractor shall furnish extra contacts for his starters where required, in lieu of which he may furnish externally mounted relays to accomplish the specified function.
- C. The following is a list of equipment and systems requiring wiring, this is in addition to equipment shown on the plans.
 - 1. Independently mounted controllers, furnished by others: where starters are furnished by other trades, and are required to be mounted remote from the motor, the Electrical Contractor shall accept and mount them and perform all power and control wiring between controls and motors as indicated. Motor controllers equipped with automatic alternators shall have two independent circuits and control sources to preclude loss of operation when one circuit fails.
 - 2. Provide 120 volt power to the irrigation system head end controller. Extend conduit raceways as required to facilitate the irrigation system installation. Coordinate quantities and routings closely with the irrigation system provider and approved shop drawings.
 - 3. Provide and install four company switches, refer to single-line.

END OF SECTION

SECTION 26 09 23 LIGHTING CONTROL DEVICES

PART 1 - GENERAL

- 1.1 Lighting control devices are identified on the drawings per legend symbols or as specifically noted. Catalog numbers from acceptable manufacturers for the common wiring devices shall be as listed herein. Catalog numbers are not listed for all devices. Other devices, such as key switches, clock hanger outlets, etc. shall be furnished by one of the manufacturers listed and shall be equal in quality to the device series listed.

PART 2 - PRODUCTS

- 2.1 Toggle type AC switches shall be listed by Underwriters Laboratories, Inc. Switches shall be 20 ampere, 120/277 volt AC and ivory in color unless noted otherwise.

Acceptable Manufacturer	General Purpose	Red Pilot Lighted	Illuminated Handle	Momentary
Cooper	1221-I series	1991 PL series	1991 IL series	1995 series
Bryant	4901-I series	4901 PL series	4901 GLI series	4921 series
Hubbell	HBL1221-I series	HBL1221 PL series	HBL1221 IL series	HBL1557 series
Leviton	1221-2I series	1221 PL series	1221 LH series	1257 series
P&S	20AC1-I series	20AC1 RPL series	20AC1 ISL series	

2.2 Ceiling/Wall Mount Occupancy Sensor

- A. Sensor shall be dual technology to detect human presence in controlled area by ultrasound and passive infrared. Dual sensing with both technologies must occur to activate lighting system. Sensor to be fully adaptive with self-adjusting and self-calibration.
- B. Sensor shall have signal processing to respond to only those signals caused by human motion. Sensor to operate instantly for room motion and time off delay adjustable for 5 – 30 minutes. Sensor to be equipped with a walk-thru mode.
- C. Sensor area coverage to be minimum of 1000 SF for one sensor. Provide multiple sensors where needed for space coverage.
- D. Sensor shall have provisions for manual-off function for lighting circuit from remote momentary switch (reset when not occupied) or maintained (off override).
- E. Provide an additional single-pole, double throw isolated contact with each power pack for remote interface.
- F. Power pack for remote mounting to match occupancy sensor.
- G. Verify color with Architect.
- H. All components to have 5-year warranty.
- I. Manufactured by Watt-Stopper, Greengate (Cooper Controls), Hubbell Building Automation, Leviton, Sensor Switch, Lutron, or Hubbell Wiring Device.

2.3 Daylight Harvesting Systems

A. Single Channel Continuous Dimming Daylighting Controller

1. Ceiling mounted 0-10VDC closed loop photo sensor, greater than 1 inch accuracy to measure total light at task plane. Full range dimming, spectral response similar to human eye, set points adjustable from 20-60FC, 50 ballast control, five-year warranty.
2. Occupant adjustment handheld remote control for raise/lower and auto functions.
3. Wattstopper #LS-301 or equal by Hubbell Building Automation or Sensor Switch.
4. Single Channel Switching Daylighting Controller
5. Ceiling mounted 0-10VDC closed loop photo sensor, controller and LCD Display. Set points adjustable from 1-1400FC, five year warranty.
6. 100 degree peak sensitivity cone of vision, optional LV override switch input, test mode, 4 user selectable set points, and LED status indicator.
7. Wattstopper #LS-102 or equal by Hubbell, Building Automation or Sensor Switch.

B. Multi-Channel Continuous Dimming Daylighting Controller

1. Ceiling mounted 0-10VDC open loop photo sensor to detect incoming natural daylight, 3-300FC, 30-3000FC and 60-6000FC selectable ranges, five year warranty; Wattstopper #LS-290C or equal by Hubbell Building Automation.
2. Three zone low voltage daylight harvesting dimming controller, 0-10VDC, 7 adjustable parameters for each zone (set point, min output, max output, ramp rate, fade rate, cutoff time delay and load shed limit). Menu driven programming, internal calculations for dimming, wall switch inputs, and DIN rail mounting; Wattstopper #LCD-203 with #BT-203 power pack or equal by Hubbell Building Automation.
3. Low voltage wall switch with "AUTO", "ON/OFF", "RAISE" AND "LOWER" buttons and single gang faceplate; Wattstopper #LS5C or equal by Hubbell Building Automation.
4. Mount controller and power pack in a NEMA 1 enclosure with DIN rail above accessible ceiling near line voltage wall switches (or near door); Wattstopper #LS-E8 or equal.

- C. Submit manufacturer designed 1/8 inch scale floor plans with cut sheets for shop drawing review showing model numbers, coverage pattern of photo sensors, zones and control, mounting instructions, etc. Submittals missing this information will be rejected.

- 2.4 Provide a device plate to suit each particular application. Cover all empty outlet boxes with a blank plate. Coverplates shall be manufactured by Pass and Seymour, Hubbell, Cooper, Bryant, Leviton or Mulberry; Taymac is an acceptable manufacturer for weatherproof non-metallic coverplates Multi-Mac Series, "While-In-Use" type, 3.5 inches depth, opaque grey, locking tab marked "EXTRA Duty".

- 2.5 In finished spaces, wall plates shall be nominal .032 inch thick, made of 302 high nickel stainless steel with brushed satin finish and beveled edges. Screws shall be metal with countersunk heads and finished to match plates. Sectional plates will not be permitted.

- 2.6 Installations consisting of three or more wall switches or wall box dimmers mounted together with either separate coverplates or a common coverplate shall have each coverplate engraved so as to identify the circuits or fixtures being controlled by each switch or dimmer. Refer to the drawings for special instructions.
- 2.7 Switches controlling luminaires served by emergency circuits shall be red and covered by a red plate.

PART 3 - EXECUTION

- 3.1 Locate devices as shown on the drawings, coordinate exact location with other trades, to avoid interference. Check for potential interference from door swings, cabinets, HVAC equipment and other wall mounted devices.
- 3.2 Clean debris from device boxes prior to installation of devices. Adjust devices and coverplates to be flush and level.
- 3.3 Occupancy Sensor Installation
 - A. Verify location of occupancy sensor(s) with selected manufacturer prior to rough-in to minimize false activation of the device. Locate sensor and adjust activation field to avoid nuisance activation by movement outside of the controlled space. Sensors shall sense any human motion in the space and allow turn on with entrance into the space.
 - B. Provide all material and labor for a complete and operational system including power and slave packs, auxiliary relay modules and backboxes. Verify application voltage rating and provide proper rated devices.
 - C. Low voltage wiring can be open wired above accessible ceilings, utilize plenum rated cabling. Installation in exposed or inaccessible locations shall be installed in conduit.
 - D. Coordinate time delay off setting of each occupancy sensor with the Owner. Maximum time delay off shall be 30 minutes. Minimum off delay is 10 minutes for intermittent use spaces.
 - E. Maintain 6 feet (minimum) to 8 ft. distance from an HVAC air outlet.
- 3.4 Daylight Harvesting Installation and Commissioning
 - A. Prior to installation, during installation and after installation manufacturer shall coordinate proper mounting locations, aiming, set up, calibration, etc. of every device. At completion of project, manufacturer shall submit proof every device is calibrated and commissioned and in good working order.
 - B. Minimum of 2 hours of Owner training shall be provided by manufacturer's representative on use of remote controls, low voltage wall switch, system components (accessible and concealed), maintenance and how to maximize energy savings. Submit outline and Owner signature sheet that this has been completed at completion of project.

- C. Provide 2 spare photo sensors of each type used on project, 2 spare remotes and 2 spare multi-channel dimming controllers/power packs used on the project. Submit proof of spares turnover to Owner with O&M Manuals.
- 3.5 Functional Testing – Lighting control devices and control system shall be tested to ensure the control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's installation instructions.
- A. Confirm that the placement, sensitivity and time-out adjustments for occupant sensors yield acceptable performance, lights turn off only after space is vacated and do not turn on unless space is occupied.
 - B. Confirm that the placement, sensitivity and adjustments of daylight sensors yield acceptable performance.
 - C. Testing shall be performed by equipment supplier. Provide report to Engineer.

END OF SECTION

SECTION 26 22 13 DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

- 1.1 Transformers shall be dry type, air cooled, two winding, insulated, high efficiency units, size and voltage as listed on drawings.
- 1.2 Construction and testing in accordance with NEMA, IEEE and ANSI Standards. Transformers shall bear the UL label for the specified temperature rise.

PART 2 - PRODUCTS

- 2.1 Manufacturer Square D, Acme, AFP Transformers, Hammond Power Solutions, G.E. or Eaton.

2.2 Transformer Construction

- A. Core: The magnetic circuit shall be 3 phase core type. Laminations are to be manufactured from non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses; the core shall be grounded by means of a flexible grounding conductor.
- B. Coils: Coils shall be wound of continuous copper magnet wire of the barrel wound design.
- C. Impregnation: Core and coil with core brackets shall be thoroughly dried followed by impregnation with a silicone varnish or non-hygroscopic thermosetting varnish.
- D. Construction: Individual core and coil assemblies shall be mounted adjacent to one another but isolated from transformer case and base by means of vibration isolators. Vertical assemblies one above the other will not be acceptable. The conduit entrance and terminal board shall be located at the bottom of the enclosure. The taps must be accessible when the cover is removed.
- E. Taps: Transformers 25 kVA and above shall be equipped with NEMA Standard full capacity 2.5 percent taps:
 - 1. Up to 500 kVA (2) FCAN and (4) FCBN taps
 - 2. Above 500 kVA (2) FCAN and (2) FCBN taps
- F. Three phase transformers shall be 480 volt delta primary and 208Y/120 volt secondary.
- G. Ground system termination bar for terminating coil, housing and system bonding jumpers and feeder equipment grounds shall not be installed on or over ventilation openings.

2.3 Performance:

- A. Temperature Rise: Transformers 25 kVA and above shall have Class H (220 degrees C.) insulation system. When the transformer is delivering the full kVA load

continuously, the temperature rise shall not exceed a 115 degree C. rise above 40 degrees C. ambient.

- B. Short Circuit Strength: Transformers shall be capable of withstanding without injury, stresses caused by short circuits on the secondary with rated voltage applied to the transformer provided the short circuit duration does not exceed time limits as specified by NEMA.
- C. Audible Sound Level: Sound levels shall be guaranteed by the manufacturer not to exceed the following when tested per NEMA and ANSI Standards:

kVA	Max. DB
0 - 9	40
10 - 50	45
51 - 150	50
151 - 300	55
301 - 500	60

- 2.4 Efficiency: Minimum efficiency shall be per NEMA TP-1. Efficiency shall be marked on label.
- 2.5 Housing: All live parts of the transformer shall be enclosed with a heavy gauge steel enclosure. Ventilation openings shall be protected against falling dirt and drip, shielded against actual touching of live parts. Top of case temperature shall not exceed 35 degrees C. above ambient. The terminal compartment shall be so designed to permit the use of 75 degrees C. wire. Lifting eyes or other provisions for lifting shall be provided.
- 2.6 Obtain from the transformer manufacturer and submit to the Architect and Engineer, eight (8) copies of guaranteed performance data on NEMA forms. The minimum efficiency to meet NEMA TP-1. Data shall be based on transformers of identical design to those specified. These copies shall be included with shop drawings. The data shall include the following:
 - A. Efficiency at 25 percent, 35 percent, 50 percent, 75 percent, 100 percent, 125 percent and 133 percent of load.
 - B. Percent regulation shall be given at 100 percent and 80 percent power factor.
 - C. Core loss in watts.
 - D. Conductor loss in watts based on reference temperature 20 degrees C. above the temperature rise of the transformer.
 - E. Impedance at reference temperature.
 - F. Sound level.
 - G. Average temperature rise with 40 degrees C. ambient.
 - H. Hot spot temperature rise with 40 degrees C. ambient.

- 2.7 A vibration isolation pad shall be field installed between the transformer enclosure and the concrete base or wall mounting supports, one at each of the four corners. The isolator pad shall be a one-bolt assembly with 0.75 inch minimum thickness neoprene isolation pad, galvanized 16 gauge minimum metal plate bonded to the neoprene pad, rubber isolator washer, flat plated steel washer, plated steel bolt; McGregor and Associates Series "TRANS-Y-PAD" (Tel. No. 1-614-451-8719) or approved equal. Size isolation pad for transformer weight and mounting configuration.

PART 3 - EXECUTION

- 3.1 Where indicated as floor set, mount transformer on and bolt to a 4 inch high concrete base furnished by this Contractor. For wall mounted units, provide all necessary mounting hardware.
- 3.2 Mount each transformer and enclosure on the vibration isolator pad (TRANS-Y-PAD).
- 3.3 All raceway connections to the transformer shall be made with liquid-tight flexible metallic conduit.
- 3.4 Clean the inside of the transformer of any debris or dirt before energizing the unit.
- 3.5 Measure primary and secondary voltages at no load and full building load and make appropriate tap adjustments to within 2 percent of rated voltage.
- 3.6 Electrical Tests
- A. Perform insulation resistance tests, winding-to-winding and windings-to-ground, utilizing a megohmmeter with test voltage output as recommended by manufacturer and International Electric Testing Association. Test duration shall be for 10 minutes with resistance tabulated at 30 seconds, 1 minute and 10 minutes. Dielectric absorption ration and polarization index will be calculated.
 - B. Perform a turns ratio test between windings at all tap settings.
 - C. Perform winding resistance tests for each winding at nominal tap position.
 - D. Perform individual excitation current tests on each phase in accordance with established manufacturer's procedures.
 - E. Measure secondary voltage phase-to-phase and phase-to-ground after final energization and prior to loading.
 - F. Provide copy of test report to Engineer.
- 3.7 Temporary heating: Apply temporary heating according to manufacturer's written instructions inside the enclosure throughout periods during which equipment is not energized and is not in a space that is continuously under normal control of temperature and humidity.

END OF SECTION

26 24 13 DISTRIBUTION SWITCHBOARD (BELOW 600 VOLTS)

PART 1 - GENERAL

- 1.1 Switchboard shall be free standing, indoor, manufactured and tested in accordance with the latest applicable standards of UL, IEEE and NEMA and shall be a single coordinated assembly of a recognized manufacturer, assuming unit responsibility for the complete assembly.
- 1.2 The switchboard shall be UL listed and labeled for UL 891 and shall meet NEMA PB2 standards.
- 1.3 Refer to drawings for accessibility requirements for each switchboard - front, rear, end/or a combination of each.
- 1.4 The switchboard manufacturer shall supply equipment which is rated, listed, and labeled for the available short circuit current and the fuse/circuit breaker combinations indicated on the drawings.

PART 2 - PRODUCTS

- 2.1 Manufacturer - Square D, Eaton, or G.E.
- 2.2 The switchboard shall be totally enclosed, dead front, free standing, front and rear aligned with front accessibility only required. The switchboard shall be Type 1 General Purpose. The framework shall be of UL gauge steel and secured together to support all coverplates, bussing and component devices during shipment and installation. Formed removable closure plates shall be used on the front, rear and sides. All closure plates are to be single tool, screw removable. Ventilation shall be provided when required. Each section shall include a single-piece removable top plate.
- 2.3 All painted parts shall be pretreated and provided with a corrosion-resistant, UL listed acrylic baked paint finish.
 - A. The paint color shall be #61 medium light gray per ANSI standard Z55.1.
- 2.4 The entire switchboard shall be suitable for operation at the available fault current indicated on the drawings. The switchboard shall be labeled to indicate the maximum available fault current rating, taking into account the structure, bussing, switchboard main disconnect(s), and switchboard branch circuit devices. Fully Rated. When series rating applied a label shall be provided per NEC 110.22 (c).
- 2.5 The switchboard through-bus shall be tin-plated or silver-plated copper. The switchboard bussing shall be of sufficient cross sectional area to meet UL Standard 891 for temperature rise. The through bus shall be rated full capacity of the main switch or breaker frame size of the main overcurrent device or the ampacity indicated on the drawings and extend the full length of the switchboard. The through-bus shall be 100 percent rated. Include provisions for extending bussing through future splicing of additional sections from both / either end. The neutral bus shall be 100 percent rated.

- 2.6 The switchboard distribution section bus shall be full height, of the same material as the through bus and shall be rated as indicated on the drawings or sized for the devices installed and for all future devices that may be installed in that section. The section neutral plate shall be 100 percent rated and provided with lugs for the devices installed and future specified devices.
- 2.7 The ground bus shall be copper and run continuous through each section; securely bolt to all structures in the assembly. Bus shall be sized per UL Standard 891 and shall have cable clamps suitable for making all ground connections. Provide a removable link between the neutral bus and ground bus. Connect all ground conductors including ground bars in bus duct to ground bus in switchboard.
- 2.8 Compartment for Power Company current transformers shall be provided in the switchboard, where shown on detail and shall meet local Power Company requirements.
- 2.9 Provide heavy duty metering instruments designed especially for switchboard use. Mount all such instruments on a front hinged door for access to internal wiring connections. Provide shorting terminal blocks on all CT circuits. All wiring passing across the door hinge shall be extra flexible type. The following items shall be included:
 - A. One digital power meter with current (each phase), voltage (phase to neutral and phase to phase), powerfactor, THD, instantaneous, minimum, maximum, kWh, and 15-minute kWD demand readings, with local digital display. Digital power meter utilizes standard switchgear style CT's with 5A secondaries. Metering voltage input may be direct (no PT's required) up to 600 VAC, or standard switchgear style PT's up to 1.7 MV. Square D model PM5563 with local display or equal by Eaton, Siemens, G.E. or Electro Industries.
- 2.10 Coordinate shipping splits to suite job site conditions. Include removable type lifting hooks and a wooden skid to permit unloading and rolling into its final location in the building.
- 2.11 Main breakers shall be solid state trip molded case 100 percent rated type including the following:
 - A. Individually mounted and bussed.
 - B. Adjustable long time, short time and instantaneous trip. For frame sizes larger than 200 amperes the trip units shall be changeable. Minimum interrupting rating shall be 65,000 amp.
- 2.12 Switchboard shall contain sub-distribution type breaker panels which contain breakers switches group mounted complete with bus bars in an integrated assembly. Breakers shall be molded case type, thermal-magnetic protection, 80 percent rated.
- 2.13 Refer to "Identification for Electrical Systems" section for nameplate requirements. Each item of the switchboard assembly shall be identified with engraved laminated nameplates.
- 2.14 A short circuit and coordination study complete with curves shall be furnished by the switchboard manufacturer which demonstrate proper interrupting ratings, coordination

between primary main breakers, the primary fuses, the main secondary breakers, the feeder breakers and fuses and ground fault protection. Provide recommended settings for the breakers and the ground fault protection. In addition to the Short Circuit and Over-Current Coordination Studies, include Arc Flash Evaluation Studies using the NFPA 70E or IEEE 1584 Standard to comply with NEC paragraph 110.16. Provide in report form, the results of the calculations and install labels/markings on unit substations, switchgear, switchboards, panelboards, industrial control panels and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.

Note: These studies must be submitted with the shop drawings. Shop drawings cannot be reviewed without these studies. The Contractor shall make all proper settings before energizing the equipment.

2.15 The electrical equipment manufacturer shall perform a short circuit analysis and protective device time-current coordination analysis of the upstream and downstream immediate electrical power distribution system devices.

A. The protective device analysis shall include:

1. A determination of settings or ratings for the overcurrent protective devices supplied.
2. An evaluation of the degree of system protection and service continuity possible with the overcurrent devices supplied. System is to be fully rated, selectively coordinated. Provide equipment to provide this level of operation.
3. Eight copies of the protective device time-current coordination analysis shall be submitted.
4. Time current characteristic curve drawings on log-log paper which illustrate:
 - a. Suggested settings of the adjustable overcurrent protective devices supplied.
 - b. The key or limiting overcurrent device characteristics, load characteristics, and protection requirements affecting the settings or ratings of the overcurrent protective devices supplied.
 - c. The degree of service continuity and system protection achieved with the overcurrent protective devices supplied.
5. A tabulation of the suggested settings for the adjustable overcurrent protective devices supplied.
6. An analysis of the results in which any inadequacies shall be called to the attention of the (engineer) and recommendations made for improvement.

B. The short-circuit analysis shall include:

1. A calculation of the maximum RMS symmetrical three-phase short-circuit current available at significant locations in the electrical system.
The results shall represent the highest short-circuit currents to which the equipment might be subjected under the reported system conditions. Appropriate motor short-circuit contribution shall be included in the calculations.
2. An evaluation of the adequacy of the short-circuit ratings of the electrical equipment supplied by that manufacturer.

3. Eight copies of the short-circuit analysis shall be submitted for approval. This submittal shall include:
 - a. A computer printout of input of input data, a computer printout of calculated results and an explanation of how to interpret the printouts.
 - b. A one-line diagram identifying all bus locations and the maximum available short-circuit current at each bus.
 - c. A bus-to-bus listing of the maximum available short-circuit current expressed in RMS symmetrical amperes and the X and R ratio of that fault current.
 - d. A table of equipment short-circuit ratings versus calculated short-circuit current values.
 - e. An analysis of the results in which any inadequacies shall be called to the attention of the (engineer) and recommendations made for improvement.
 - C. Arc-Flash analysis shall include: In addition to the short circuit and over-current coordination studies, include arc flash evaluation studies using the NFPA 70E or IEEE 1584 Standard to comply with NEC paragraph 110.16. Provide in report form the results of the calculations and install labels/markings on each medium voltage switchgear, unit substations, switchboards, panelboards, industrial control panels and motor control centers that are likely to require examination, adjustment, servicing or maintenance while energized.
 1. Emergency side distribution overcurrent protection shall be fully coordinated including use of manufacturer's selectivity tables and charts. Circuit breaker models shown on plans are selectively coordinated, manufacturers of equal selectively coordinated equipment shall be supplied at no additional charge.
 - D. Copies of the analysis shall be submitted with the switchboard shop drawings.
 - E. The primary switchboard manufacturer shall coordinate relay settings of the high voltage switchgear breakers and fuses, and secondary circuit breakers setting with the Power Company relaying including instantaneous and ground fault protection.
 - F. The desired settings shall be calibrated and set in the field by an authorized representative of the switchboard manufacturer.
 - G. Post a durable copy of the "as-left" relay settings and fuse ratings in a convenient location within each switchboard assembly. Deliver four additional copies of the settings and fuse ratings to the Engineer.
- 2.16 Factory testing shall be completed on assembled unit verifying proper operation of components and wiring before shipment. Two (2) copies of factory test reports shall be provided before equipment delivery.
- 2.17 Provide a Transient Voltage Surge Suppressor (TVSS) on the load side of the main switch. The TVSS shall be factory mounted and wired with remote status panel in front hinged door of that switchboard section. All wiring passing across the door hinge shall be extra flexible. Barrier off section from switchboard bussing. Serve TVSS from an adjacent fused switch or breaker, refer to drawings and TVSS manufacturer's

recommendations; fuse size and type as recommended by the TVSS manufacturer shall be shown on the switchboard shop drawing submittal. Circuit conductors shall not exceed 18 inches in length.

- The SPD for main service entrance rated 800 A and above shall be located inside the main section of the switchboard and have:
 - SPD shall be UL labeled as Type 1 – verified through certification at UL.com.
 - A surge current capacity of 240,000 amps minimum total per phase (8/20 microsecond surge current pulse) and rated for category C3; minimum 120 kA L-G, 120 kA L-N, 120 kA N-G.
 - SPD shall be UL labeled with 20 kA I-nominal I-n for compliance to UL96A Lightning Protection Master Label and NFPA 780.
 - UL 1449 Listed Voltage Protection Ratings (VPRs) shall not exceed the following:
- | | | | | |
|------------------|-------|-------|-------|-------|
| • System Voltage | L-N | L-G | L-L | N-G |
| 208Y/120 | 800V | 800V | 1200V | 700V |
| 480Y/277 | 1200V | 1200V | 2000V | 1200V |
- (Mode VPRs verifiable at UL.com. Numerically lower is allowed/preferred/ old-style suppressed voltage ratings (SVRs) shall not be submitted, nor evaluated due to outdated less-strenuous testing).
 - UL 1449 Listed Maximum Continuous Operating Voltage (MCOV):
- | | | |
|------------------|--|------|
| • System Voltage | Allowable System Voltage Fluctuation (%) | MCOV |
| 208Y/120 | 25% | 150V |
| 480Y/277 | 15% | 320V |
- The SPD shall have a minimum repetitive surge current rating of 5,000 ANSI/IEEE C62.41 Category C3 impulses. Manufacturers may propose alternative maximum surge current ratings provided that this requirement is met.
 - All modes of protection L-L, L-N, L-G and N-G.
 - When a suppression filter system is supplied, it shall comply with UL 1283. Typical noise attenuation shall be:
-34 dB at 100 kHz; -51 dB at 1 MHz; -54 dB at 10 MHz; -48 dB at 100 MHz.
 - Approved manufacturers and models, subject to compliance with requirements, are:

- MAIN SERVICE

	120/208V	277/480V
Eaton	SPD250-208Y3M	SPD260-480Y3M
Joslyn (T&B)	JSP240-3Y208B	JSP240-3Y480B
Current Tech (T&B)	CGP120-120/208-3GY	CGP120-277/480-3GY
ASCO	520120YP25ACCLIX	520277YP25ACCLIX
Square D	SSP02EMA24D	SSP04EMA24D

PART 3 - EXECUTION

- 3.1 The entire metal enclosed assembly shall be bolted to a front and rear base channel set level on concrete base. A removable metal closer plate, which seals the opening between front and rear channels, shall be furnished at each end of the switchboard.
- 3.2 Provide 4 inch high concrete housekeeping base below the switchboard. Concrete to be 3000 pound test with #4 rebar 12 inches on center. Chamfer top and vertical edges.
- 3.3 Adjust circuit breaker trip and time delay settings to values as indicated in coordination study.
- 3.4 Provide engraved label with the nominal system voltage, available fault current clearing time of main OCPD and date label applied near the main OCPD from information in the Protective Device Study or furnished by Owner.
- 3.5 Provide special tools for operation of equipment.
- 3.6 Connect metering to garage monitoring system. Provide network interface connection. Connect all meters in distribution equipment.
- 3.7 Post a durable copy of the “as-left” relay settings and fuse ratings in a convenient location within each switchboard assembly. Deliver four additional copies of the settings and fuse ratings to the Engineer.
- 3.8 Apply labels with setting determined from Arc-Flash Study. Test the Arc-Flash Reduction Maintenance System.

END OF SECTION

SECTION 26 24 16 PANELBOARDS

PART 1 - GENERAL

- 1.1 Each panelboard shall comply with all applicable codes, recommended practices and standards of IEEE, NEMA and UL. Panelboard shall be UL labeled.
- 1.2 A number of general purpose panelboards are existing Square D panels and located in Lot 24. These existing panels shall be utilized for the Lot 23 project.

PART 2 - PRODUCTS

2.1 Panelboard Types

A. 240 Volt (Maximum) AC Panelboards

1. New breakers shall be "bolt-on" type and in sizes thru 100 amp shall be minimum 10,000 amp, I.C. rated with adequate rating to interrupt the available fault current for the existing equipment.
2. GFCI breaker – UL Class A (5 milliamperes sensitivity, combination type). Ground fault circuit protection shall be an integral part of the branch circuit breaker which also provides overload and short circuit protection. Space required in panelboard shall be same as standard single pole circuit breaker.
3. Panelboard is existing by Square D Type "NQOD".
4. New 240 Volt (Maximum) AC panelboards shall be manufactured by Square D, Eaton, or General Electric.

B. 277/480 Volt AC Panelboards

1. Breakers shall be "bolt-on" type and in sizes thru 100 amps shall be minimum 14,000 amp I.C. rated with adequate rating to interrupt the available fault current; for a fully rated system or similar to:
2. Panelboards existing by Square D

C. Circuit Breaker Distribution Panelboard

1. Main and branch breakers shall be solid state trip molded case type with long time, short time, instantaneous trip and ground fault protection – with zone interlocking with the main solid state trip molded case breaker or remote switchgear feeder circuit breaker./Breakers shall be molded case type, thermal-magnetic protection, 80 percent rated.
2. Power and distribution panelboards are existing by Square D.

- 2.2 Refer to "Identification for Electrical System" Section 26 05 53, for nameplate requirements.

2.3 General Construction

- A. Circuit breakers shall be thermo magnetic, bolted type and where more than one pole is used, they shall employ a common trip.

- B. Breakers in panelboards used for switching of 120 and 277V. fluorescent lighting circuits shall be rated for switching duty UL "SWD" or "HID" type; for switching high-intensity discharge lighting shall be "HID" type.
 - C. Breakers used for protection of heating, air conditioning and refrigeration equipment shall be UL "HACR" type.
- 2.4 Any new breaker placed in an existing panelboard shall have an AIC rating equal to or greater than that of the existing equipment in that panelboard. In no case shall the overall AIC rating of the existing equipment be reduced by the addition of new breakers.

PART 3 - EXECUTION

- 3.1 Mount top of wall mounted cabinets 6 feet 0 inches above floor. Coordinate location of recessed panels so they are accessible and to avoid interference with other equipment and trades. Mount and anchor floor set panelboards on a 4 inch high concrete pad furnished by this Contractor.
- 3.2 The position of breakers in each panel shall be arranged in the field for sequence phasing by this Contractor to best suit wiring conditions and balancing of phases. Fill in, typewritten, the directory of each branch circuit panelboard.
- 3.3 For multi-wire branch circuit group circuit breaker together and provide breaker handle tie. Group conductors together with tie-wrap.
- 3.4 Adjust circuit breaker trip and time delay settings to values as indicated in the coordination study.

END OF SECTION

SECTION 26 27 16 ELECTRICAL CABINETS AND ENCLOSURES

PART 1 - GENERAL

- 1.1 Work includes all special cabinets and enclosures; equipment shall conform to requirements of N.E.C. and shall be UL labeled.

PART 2 - PRODUCTS

2.1 Telephone Miscellaneous Cabinets

- A. Indoor cabinets shall match panelboard finish and construction and shall be manufactured by Siemens, Square D, Eaton, Tanco Inc., G.E. or Engineer approved equal.
- B. Provide backboard for mounting equipment, $\frac{3}{4}$ inch plywood. Paint matte white.

2.2 Indoor Cabinets - NEMA 1

- A. Cabinets shall be galvanized code gauge steel, finished gray enamel or manufacturer's standard equivalent finish, of sizes shown with flush painted hinged door and master keyed cylinder locks keyed to match panelboard locks. Cabinets in finished areas shall be designed for flush mounting with separable front overlapping flange. Cabinets in concealed areas shall be surface mounted types.
- B. Each cabinet shall be equipped with a 0.75 inch thick waterproof fir plywood backboard painted gray.

PART 3 - EXECUTION

- 3.1 Mount the cabinets and enclosures as indicated on the drawings and in accordance with manufacturer's instructions.
- 3.2 Mount top of wall mounted cabinets 6 feet-0 inches above floor. Coordinate location of recessed cabinets so they are accessible and to avoid interference with other equipment and trades.
- 3.3 Mount and anchor floor set enclosures on a concrete pad furnished by this Contractor. Indoor pads shall be 4 inches high; outdoor pads shall be steel reinforced as indicated on the drawings.
- 3.4 Refer to Section 26 05 53 "Identification for Electrical System" Section for nameplate requirements.

END OF SECTION

SECTION 26 27 26 WIRING DEVICES AND COVERPLATES

PART 1 - GENERAL

- 1.1 Wiring devices are identified on the drawings per legend symbols or as specifically noted. Receptacles are identified in the legend by NEMA configuration numbers only. Catalog numbers from acceptable manufacturers for the common wiring devices shall be as listed herein. Catalog numbers are not listed for all devices. Other devices, such as clock hanger outlets, etc. shall be furnished by one of the manufacturers listed and shall be equal in quality to the device series listed.
- 1.2 When shop drawings are required for wiring devices and coverplates, the submittal shall be comprehensive for all wiring device configurations listed in the legend and for devices specifically noted on the drawings.

PART 2 - PRODUCTS

- 2.1 Extra hard use specification grade receptacles shall be listed by Underwriters Laboratories, Inc. Receptacles shall be minimum 20 ampere, 125 volt, NEMA configuration 5 20R and ivory in color unless noted otherwise.

Acceptable Manufacturer	Single	Duplex	Ground Fault	Isolated Ground
Cooper	5361-V	AH5362V	VGF20V	IG5362-V 3
Bryant	5361-I	5362-I	GF20ILA	5362IG-I
Hubbell	HBL5361-I	HBL5362-I	GF20ILA	IG8300
Leviton	8361-I	5362A-I	7899-I	8300-IGI
P&S	8301-I	5362A-I	2095-I	IG5362-I

- 2.2 Receptacles installed in a damp or wet location shall be a listed weather-resistant (WR) type.
 - A. Receptacle shall be installed in a listed weatherproof enclosure, whether or not the attachable plug cap is inserted.
- 2.3 Provide GFCI devices as shown on drawings and in compliance with NEC 210.8 for type and location.
- 2.4 Transient voltage surge suppressors (SPD-ANSI/IEEE Category A and B), UL 1449 suppression (clamping) rating of 400 V, 3 mode protection (LN/LG/NG) for 120 V branch circuits:
 - A. Duplex receptacles, 120 V, 20 A shall be Pass and Seymour 6362-ISP, Hubbell HBL5362ISA, Leviton 5380-I, Bryant SP53-TIGIA or Cooper/Arrow Hart 5362IS. Receptacle to be listed UL 1449 Type 3.
 - B. Suppression strip with a heavy duty 6 ft. 14-2 AWG power cord, 6 electrical NEMA 5-15R outlets, 120 V, 15 A, computer grade on/off 20 A switch, resettable circuit breakers, internal thermal fusing, hybrid suppression circuit and comprehensive diagnostics. Strip to be listed UL 1449 Type 3.

EFI Electronics Corp. - Model 453 (15 A Overload Protection)
Joslyn Electronic Systems - Model 1203-03 (15 A Overload Protection)
Pass and Seymour - Model C6-L (15 A Overload Protection)
Hubbell Model HBL6PS350A (15A Overload Protection)

- 2.5 Provide a device plate to suit each particular application. Cover all empty outlet boxes with a blank plate. Coverplates shall be manufactured by Pass and Seymour, Hubbell, Cooper, Bryant, Leviton or Mulberry; Taymac is an acceptable manufacturer for weatherproof non-metallic coverplates Multi-Mac Series, "While-In-Use" type, 3.5 inches depth, 'Extra Duty', opaque grey, locking tab. Provide jumbo size plates for outlets installed in masonry walls.
- 2.6 In finished spaces, wall plates shall be nominal .032 inch thick, made of 302 high nickel stainless steel with brushed satin finish and beveled edges. Screws shall be metal with countersunk heads and finished to match plates. Sectional plates will not be permitted.

PART 3 - EXECUTION

- 3.1 Locate devices as shown on the drawings, coordinate exact location with other trades, to avoid interference. Check for potential interference from door swings, cabinets, heating equipment and other wall mounted devices.
- 3.2 Clean debris from outlet boxes.
- 3.3 Install receptacles with grounding pole on bottom.
- 3.4 Verify each receptacle device is energized and test each device for proper polarity.
- 3.5 Adjust devices and wall plates to be flush and level.

END OF SECTION

SECTION 26 28 13 FUSES

PART 1 - GENERAL

- 1.1 Safety switches and other fusible protective devices provided under this contract shall be complete with fuses properly sized to protect the feeders and equipment served.
- 1.2 Fuses shall not be shipped installed in switches in electrical equipment nor shall they be shipped to the job site until the equipment is ready to be energized. Fuses shall be of the same manufacturer to retain selectivity as designed.

PART 2 - PRODUCTS

- 2.1 Manufacturers shall be Bussmann, Mersen, Littelfuse or Edison or Engineer approved equal.
- 2.2 Fuses shall be current limiting with 200,000 amperes interrupting capacity, all shall be UL labeled.
- 2.3 Fuses, 601 ampere to 6,000 ampere (bolt type dimensions) shall be UL Class "L" fuses. The size and type is indicated on drawings; Bussmann HI CAP time delay fuse KRP C shall be used.
- 2.4 Fuses with ampere ratings 1 ampere to 600 ampere (standard dimensions) shall be UL Class RK 1. The size and type is indicated on drawings. Bussmann LOW PEAK Time Delay fuse LPN RK (250 volts) or LPS RK (600 volts).
- 2.5 Where Bussmann specific fuse types are indicated above or on the drawings, acceptable fuses by cross reference of manufacturers are:

Voltage UL Class	Ratings	Bussmann	Mersen	Littel Fuse	Edison
L	600 V	HI CAP KRP C	AMP TRAP A4BQ()	POWR-PRO KLPC	LCL
RK 1	250V 600V	Low Peak LPN RK LPS RK	AMP TRAP II A2D () R A6D () R	POWR-PRO LLN-RK LLS-RK	LEN-RK LES-RK
J (Time Delay)	600V	LPJ ()	AJT ()	JTD ()	JDL ()

PART 3 - EXECUTION

- 3.1 Place a fuse identification label showing type and size inside door of each switch. Use fuse reducers where fuse gaps are larger than fuse dimension.
- 3.2 Verify fuse types before installation for proper application by voltage and ampere ratings; fuses protecting motors shall not exceed 150 percent of motor nameplate amps. (Applies to fuses in sizes 600 amps and below.)

- 3.3 Furnish the Owner with a minimum of 25 percent of quantity of each size installed, but not less than one complete set of three spare fuses for each size of fuse furnished. Provide a typewritten bill of material and install in plastic cover to inside of cabinet door.

END OF SECTION

SECTION 26 28 16 DISCONNECT SWITCHES & COMPANY SWITCHES

PART 1 - GENERAL

- 1.1 Provide disconnect switches, fused and non-fused, where indicated on the drawings and in the specifications, and where required by the N.E.C.
- 1.2 Provide company switches by LEX, ETC or SSRC.

PART 2 - PRODUCTS

- 2.1 Disconnect switches shall be listed by Underwriter's Laboratories and shall be manufactured by Square D, G.E. or Eaton. All starters and disconnect switches shall be of the same manufacturer unless otherwise approved.
- 2.2 Switches shall be Heavy-Duty Type, NEMA 1 enclosures, non-fused except where fuses are specified or required to protect wiring from overload; provide raintight NEMA 3R type enclosures for outdoor applications unless otherwise noted.
- 2.3 Disconnect switches shall be quick-make, quick-break, externally operated with door interlocked with operating handle. Provide solid neutral and ground bars where indicated or where required by the application.
- 2.4 Disconnect switches shall have multiple padlock provisions in the off position.
- 2.5 The fuse holders shall be designed for Class "R" rejection type fuses.
- 2.6 Refer to "Identification for Electrical Systems" Section for nameplate requirements.
- 2.7 Disconnect switches located outside shall be raintight NEMA 3R, unless noted otherwise.
- 2.8 Company switches design is based upon LEX Products Corp.

The 200 amp company switches shall be equal to LEX: CS-200F-C5D-G-1

The 400 amp company switches shall be equal to LEX: CS-400F-C6D-1

- a) Unit shall be UL listed and labeled.
- b) Enclosure to be fabricated using 12-gauge steel.
- c) Enclosure to have four (4) welded mounting tabs.
- d) Unit shall contain one (1) 3-pole main breaker with 65K AIC rating.
- e) Breaker shall be installed with a shunt trip mechanism that activates when the access door is opened.
- f) Access door shall contain a keyed locking "T" handle.
- g) Breaker shall be equipped with a padlock attachment to lock the handle in the off position when not in use.

- h) Fused indicator lights shall be provided for each phase and ground continuity.
- i) Pull handles shall be installed on each side of the breaker to protect the switch.
- j) All internal power connections shall be to UL listed insulated power distribution blocks with up to 500 MCM wire capacity.
- k) Output connections shall be provided by UL listed insulated power distribution blocks with up to 500 MCM wire capacity.
- l) Cable entry opening shall contain five (5) or six (6) 1.25 x 3" slots.
- m) Cable connection shall be through hinged door that can only be accessed from inside connection chamber.
- n) Bare cable connection to distribution blocks shall be secured with spring loaded strain relief.
- o) UL listed output receptacles shall be mounted inside connection chamber.
- p) Connection chamber is protected by a locking access door and an interlock switch wired to the breaker shunt trip

PART 3 - EXECUTION

- 3.1 Mount top of wall mounted disconnects and company switches 6 ft.-0 inches above floor where space permits.
- 3.2 Coordinate location of disconnect switches to avoid interference with other equipment and trades.
- 3.3 The 400 amp company switches require a 200% neutral conductor.
- 3.4 The location of company switches shall be placed to avoid interference with other equipment and trades. Provide 36 inches minimum clearance in front of the company switches for theatrical cabling connections.

END OF SECTION

SECTION 26 29 13 MOTOR CONTROLLERS

PART 1 - GENERAL

- 1.1 Schedules on the drawings list motors, starter requirements and associated controls. Motor starters and disconnects shall be furnished under this Contract except where specifically shown or specified to be furnished by other trades. Motor starters and disconnects shall be manufactured and rated in accordance with NEMA, UL and IEEE standards. IEC RATED CONTACTORS AND OVERLOADS ARE NOT ACCEPTABLE.
- 1.2 Refer to "Disconnect Switches" Section for switch requirements.
- 1.3 All motor starters shall be rated for the available fault current at the point of application.

PART 2 - PRODUCTS

- 2.1 Manufacturer Allen Bradley, whose catalog numbers are used herein as a standard, or equivalent by Square D Type S (Class 8536), G.E. Series CR306, Eaton Class AN16. All starters and disconnect switches shall be of the same manufacturer unless otherwise approved.
- 2.2 Where new motor starters and disconnect switches are to be installed in existing motor control centers they shall match existing units.
- 2.3 Magnetic starters shall be line voltage suitable for the service listed on the drawings. Each starter shall have one extra auxiliary contact for future control purposes, a 3 leg melting alloy thermal overload relay on a single block, a manual reset mechanism, a 120 volt control coil, Bulletin 509. Contractor shall have the option of installing Bulletin 512 combination starters in place of separately mounted switches and starters. Disconnects shall be non-fused type unless otherwise specifically indicated or required by NEC.
- 2.4 A HAND-OFF-AUTO selector switch shall be mounted in the face of each starter enclosure. The selector switch shall be so wired that when it is in the HAND or AUTO position, all SAFETY controls are wired in series with the selector switch; all CONTROL DEVICES shall be wired in the AUTO position only.
- 2.5 Each starter enclosure shall have a suitable 120 volt secondary control transformer fused separately on each phase of the primary and secondary, and grounded on the secondary.
- 2.6 Each starter shall have a red LED pilot light mounted in the face of the starter enclosure. The LED shall be wired so it will be on when the motor is energized.
- 2.7 Magnetic starters shall be furnished for motors, one horsepower and greater or any 3 phase motor, unless indicated otherwise on plan.
- 2.8 Provide adjustable 0 to 60 second "on" time delay relay on starters where indicated on drawings and wire into the "auto" position of the selector switch to delay motor starting.
- 2.9 Provide adjustable phase failure-reversal-undervoltage relay protection on all motor starters NEMA size 3 and larger; wire ahead of the H-O-A switch.

- 2.10 Manual starters with thermal overload protection shall be furnished for fractional horsepower, single phase motors unless otherwise noted and shall be Bulletin 600 with a pilot light, flush mounted in finished areas.
- 2.11 Unless otherwise noted or required by Code, safety switches shall be Heavy Duty Type, NEMA 1 enclosures, non-fused except where fuses are specified or required to protect wiring from overload. Switches shall be quick make, quick break, externally operated with door interlocked with operating handle and padlock provisions in OFF position. Provide solid neutral and ground bars where required. Switches located outside shall be raintight NEMA 3R, unless otherwise noted.

PART 3 - EXECUTION

- 3.1 Check full load ampere and service factor rating of each motor after installed and furnish the proper size overload heater elements to protect the motor.
- 3.2 Mount floor mounted control centers on a 4 inches high concrete base, furnished by this Contractor.
- 3.3 Those portions of interlock and control wiring which are required but not prewired, shall be done in the field.
- 3.4 Motor starters and disconnect switches shall be conveniently accessible; all NEC minimum clearances from walls, pipes, ducts, equipment, etc., shall be maintained. Locate as inconspicuously as possible in finished spaces.
- 3.5 Refer to Section 26 05 53 "Identification for Electrical Systems" section for nameplate requirements.
- 3.6 Place label in each motor starter door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, voltage / phase, OL type and OL size.

END OF SECTION

SECTION 26 51 13 INTERIOR LUMINAIRES, LAMPS AND BALLASTS

PART 1 - GENERAL

- 1.1 Refer to schedule on the drawings for information on luminaires, lamps and manufacturers. Luminaires of manufacturers other than those listed, if offered, shall be on a substitute basis and so listed as a substitute with the bid. (Refer to Section 26 05 01, para. 2.4 B.)
- 1.2 The catalog numbers listed on the schedule do not necessarily have complete prefix and suffix designations for placing the luminaire order. The Contractor shall verify these numbers and include in his bid the necessary plaster frames, accessories, trim, mounting hardware, etc. to achieve a coordinated installation with ceiling types indicated on the architectural drawings and in specifications. The Contractor shall provide any hardware indicated by notes on the fixture schedule.
- 1.3 Luminaires, ballasts and individual components shall bear UL label. All ballasts including compact fluorescents shall be high efficiency and high power factor (HPF).

PART 2 - PRODUCTS

2.1 LED Luminaire Components

A. LED Luminaire Components

1. LED luminaire shall be rated for an installation/ambient temperature from -40 degrees C to +40 degrees C.
2. LED luminaire shall be modular in design (when applicable per the basis of design) with the ability to replace drivers, light engines, arrays, optics, reflectors, etc., without having to replace the entire luminaire.
3. The heat sink shall be easily accessible for maintenance or cleaning to maintain the overall thermal performance of the luminaire within specifications. The light engine and driver shall be easily accessible for maintenance.
4. LED luminaire (type V distribution) shall have an even distribution of luminous intensity within the 0 degree to 90 degree zone. Luminous intensity at any angle within this zone shall not differ from the mean luminous intensity for the entire 0 degree to 90 degree by more than 10 percent.
5. Exterior LED luminaire shall be full cutoff or fully shielded as defined by IESNA-RP-8.
6. LED luminaire shall come standard with the ability for full dimming.
7. LED Luminaire shall have a minimum of 5 year warranty.
8. Solid State Lighting (LED) – UL 1598.

B. LED/LED Module

1. LED/LED Module(s) shall be manufactured by:
 - a. Nichia.
 - b. Cree.
 - c. Achriche.
 - d. Phillips.
 - e. Osram/Sylvania.
 - f. Approved Equal (By Engineers approval).
2. LEDs shall be of the highest production quality.
3. LED/LED Module shall be rated for 50,000 hours of life at 70 percent output (L70) and shall have been tested in accordance with IESNA LM-79, LM-80, and TM-21.
4. LED/LED Module manufacturers shall adhere to LED package manufacturer guidelines, certification programs, and test procedures for thermal management.
5. LED/LED Module(s) shall be rated for a minimum luminous efficacy of 80 Lumens per Watt (lm/W).
6. Color consistency NEMA SSL-3.
7. LED/LED Module(s) shall have one of the following designated CCTs (Correlated Color Temperature) per ANSI C78.377-2008 and all within the 7-step chromaticity quadrangles as defined below:
 - a. 2700 K
 - b. 3000 K
 - c. 3500 K
 - d. 4100 K
 - e. 5000 K
8. LED/LED Modules shall originate from a common manufactured batch source. Contractor shall provide 5 percent of each module specified as spare in original sealed packaging and transport to the Building (and put in storage) as directed by the Owner.

C. LED Driver

1. The driver shall have 50,000 hrs. of anticipated/rated life. Minimum efficiency of 85 percent at full load conditions.
2. UL 8750 approved.
3. Driver shall meet UL Class 2, FCC 47CFR Part 15, Class A minimum compliant.
4. Driver shall have inherent short-circuit protection, self-limited, overload protected.
5. Driver shall have a Class A sound rating.
6. 100 to 277 volt input rating. Power factor .90 or higher.
7. All drivers shall provide full LED dimming range. The drivers in every LED fixture shall have the capability to be dimmable, whether indicated to be dimmed or not on the drawings.
8. Driver shall have a minimum of 5 year warranty.
9. EC shall provide 5 percent of each driver specified as spare in original sealed packaging and transport to the building (and put in storage) as directed by the Owner.

D. The complete LED luminaire assembly shall be of the latest and highest efficacy design available.

- E. The LED luminaire assembly shall be Design Lights Consortium (DLC) approved.
- F. Equal fixtures/luminaires provided other than the first name specified luminaire, shall at a minimum, provide the same if not more delivered lumens. Additionally the “equal” luminaire shall not exceed the first name specified luminaires total system input watts.

PART 3 - EXECUTION

3.1 Submittals

- A. Detailed cut sheets for all LED luminaire complete assembly shall be submitted for approval with shop drawings. Identifying pertinent information such as the manufacturer, frequency operation, THD, crest and ballast factor, reset thermal protection, etc. Shop drawings will be rejected if required information is not submitted.
- B. Submittals shall include dimensions, ratings, performance data and components of each luminaire. Where indicated on schedule, submit two (2) color chips illustrating luminaire finish color.

3.2 Luminaire Hanging and Supporting

- A. Support each surface mounted or suspended luminaire in a minimum of two locations. In addition, where luminaires are in a continuous row, they shall be fastened together on each end in two places. For suspended luminaires provide pendant length required to suspend luminaire at indicated height.
- B. Recessed luminaires shall be supported at all four corners. Additionally, securely fasten each luminaire to the ceiling framing member by mechanical means such as bolts, screws, rivets or approved clips; install a minimum of one on each of the four sides of luminaire. This Contractor shall coordinate luminaire locations and luminaire weight with the trade installing the ceiling system to ensure adequate hangers are installed to support the weight of the ceiling plus twice the weight of each luminaire.
- C. Surface or flush luminaires in ceilings of the suspended lay in type shall be installed so that the long dimension of the luminaire is supported on the main support members of the ceiling system.
- D. In addition, all recessed luminaires for lay in ceilings shall be equipped with at least two galvanized steel safety support wires, or chains, attached from the luminaire housing to the structure independent of the ceiling system; hangers supporting ceiling system shall not be used.

3.3 Alignment and Cleaning

- A. Luminaires shall be mounted straight, level and true to the building lines. Warped or damaged luminaires shall be replaced or repaired to the satisfaction of the Architect and Owner.

- B. Immediately preceding the final inspection, this Contractor shall thoroughly clean all luminaires of dust, dirt, grease, fingermarks, etc. All lamps shall be operating at the time of Owner's acceptance.
- C. Coordinate location of luminaires carefully with the Architectural reflected ceiling plan. Verify that no surface mounted luminaire interferes with door swings.
 - 1. Coordinate locations of luminaires with mechanical ducts, sprinkler pipes/heads, smoke alarms and fire alarm devices prior to rough-in to prevent conflicts.
 - 2. Where reflected ceiling plans indicate a larger quantity of luminaires than that shown on the electrical drawings for a particular space, the reflected ceiling plan shall be followed for that space.
- D. Adjust all adjustable fixtures to the satisfaction of the Architect and the Owner.

END OF SECTION

SECTION 26 51 14 LIGHTING CONTROL PANELS

PART 1 - GENERAL

1.1 Summary

- A. This section covers the lighting controls for all the spaces. The intent of this specification is to provide a complete, programmable, intelligent, networked low voltage lighting control system for the control of lighting fixtures and/or circuits as described herein and as shown on the electrical drawings and schedules. This lighting control system applies to all the lighting fixtures (inside and outside) indicated on the lighting plans.
- B. Where applicable standards have been established, all equipment, individual components, and installation methods shall meet or exceed the requirements of these standards including the (UL) Underwriters Laboratories, (NEC) National Electric Code, (FCC) Federal Communications Commission, and any additional local codes that may be applicable.
- C. All system components shall arrive at the job site completely factory pre-wired and ready for field installation. All connections shall be clearly and permanently labeled to facilitate correct and easy termination of equipment. Coordinate the location and placement of each device, cable, and controller with the Architect, Engineer, Construction Manager, Project Managers, and other trades to minimize conflicts.
- D. Section includes a networked lighting control system comprised of the following components:
 - 1. System Software Interfaces
 - a. Management Interface
 - b. Historical Database and Analytics Interface
 - c. Visualization Interface
 - d. Personal Control Applications
 - e. Smartphone Programming Interface for wired devices
 - 2. System Backbone and Integration Equipment
 - a. System Controller
 - b. Open ADR Interface
 - 3. Wired Networked Devices
 - a. Wall Switches, Dimmers and Scene Controllers
 - b. Graphic Wall Stations
 - c. Auxiliary Input/Output Devices
 - d. Occupancy and Photocell Sensors
 - e. Wall Switch Sensors
 - f. Embedded Sensors
 - g. Power Packs and Secondary Packs
 - h. Networked Luminaires
 - i. Relay and Dimming Panel
 - j. Bluetooth® Low Energy Programming Device

- k. Communication Bridge
- 4. Wireless Mesh Networked Devices
 - a. Sensor Interface
 - b. Light Controllers
 - c. Digital Sensor Attachments
 - d. Sensor-Controllers
 - e. Networked Luminaires
 - f. Communication Bridge
- 5. Wireless Dual-Band Networked Devices
 - a. Wall Switches and Dimmers
 - b. Scene Controllers
 - c. Embedded Sensor-Controllers
 - d. Distributed Control Nodes
 - e. Power Packs and Secondary Packs
 - f. Networked Luminaires
 - g. Communication Adapter
- 6. The networked lighting control system shall meet all of the characteristics and performance requirements specified herein.
- 7. The contractor shall provide, install and verify proper operation of all equipment necessary for proper operation of the system as specified herein and as shown on applicable drawings. Manufacturer's representative shall provide time for system programming and support for contractor during installation. Additionally, the manufacturer's representative shall provide 8 hrs of training to the owner's staff.

1.2 Related Documents

- A. Section 26 27 26 Wiring Devices
- B. Section 26 09 23 Lighting Control Devices
- C. Section 26 51 13 Interior Lighting Fixtures

1.3 Shop Drawings – Submit shop drawings including product data sheets and wiring diagrams per requirements in the General Conditions including the following:

- A. The supplier shall submit for approval with shop drawings, schematic and 0.125 scale point to point wiring diagrams showing all devices, number and size of wires, etc. SHOP DRAWINGS WILL BE REJECTED UNLESS THE SUBMITTAL INCLUDES ALL THIS REQUIRED INFORMATION. At completion of the project, the wiring diagrams shall be revised "as-built" and included as part of the maintenance manuals.
- B. Supplier shall provide single line drawings indicating control panels, relays, local control switching etc. with shop drawing submittal. List and describe devices used in the system. Diagrams shall be specific to the project.
- C. Coordinate the layout of all equipment with the Owner and all other power or technology equipment.

- D. Job specific system block diagram indicating the actual hardware required for the project including part numbers and interconnecting wiring requirements.
- E. Complete and comprehensive Equipment Catalog Specification Sheets of each component provided, job specific.
- F. Bill of Materials necessary to install the networked lighting control system.
- G. Product Specification Sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
- H. Riser Diagrams showing device wiring connections of system backbone and also typical per room/area type.
- I. Information Technology (IT) connection information pertaining to interconnection with facility IT networking equipment and third-party systems.
- J. Other Diagrams and Operational Descriptions – as needed to indicate system operation or interaction with other system(s).
- K. Contractor Startup/Commissioning Worksheet (must be completed prior to factory startup).
- L. Service Specification Sheets indicating general service descriptions, including startup, training, post-startup support, and service contract terms.
- M. Hardware and Software Operation Manuals.
- N. Submittals that do not contain all the above information will be rejected.

1.4 Approvals

- A. Alternate products or systems require submission of catalog datasheets, system overview documents and installation manuals to engineer.

1.5 Quality Assurance

A. Product Qualifications

- 1. System electrical components shall be listed or recognized by a nationally recognized testing laboratory (e.g., UL, ETL, or CSA) and shall be labeled with required markings as applicable.
- 2. System luminaires and controls are certified by manufacturer to have been designed, manufactured and tested for interoperability.

- B. All materials furnished under this contract shall be new, of highest quality and shall be of a regularly manufactured line, currently in production at the time of installation.

- C. All equipment described herein or otherwise required to perform the specified system functions shall be a regular product line, produced by the system manufacturer. Alternate Manufacturers shall have produced equipment of compatible features and performance.
- D. Installation and Startup Qualifications
 - 1. System startup shall be performed by qualified personnel approved or certified by the manufacturer.
 - 2. Installation shall be in compliance with the National Electric Code and all other applicable codes.
- E. Service and Support Requirements
 - 1. Phone Support: Toll free technical support shall be available.
 - 2. Remote Support: The manufacturer shall offer a remote support capability.
 - 3. Onsite Support: The manufacturer shall offer onsite support that is billable at whole day rates.
 - 4. Service Contract: The manufacturer shall offer a Service Contract that packages phone, remote, and onsite support calls for the project. Response times for each type of support call shall be indicated in the terms of the service contract included in the bid package.

1.6 Project Conditions

- A. Only install equipment after the following site conditions are maintained:
 - 1. Ambient Temperature: 14 to 105°F.
 - 2. Relative Humidity: less than 90% non-condensing
- B. Equipment shall not be subjected to dust, debris, moisture, or temperature and humidity conditions exceeding the requirements indicated above, at any point prior to installation.
- C. Only properly rated equipment and enclosures, installed per the manufacturer's instructions, may be subjected to dust and moisture following installation.

1.7 Warranty

- A. The lighting control system shall require no special maintenance and be manufactured for a period not less than 5 years. An extended service contract and/or electronic monitoring shall be available to the Owner at a rate specified per year upon request. The manufacturer, upon inspection of any failed component or device, shall determine whether to repair or replace the component or device.
- B. Provide warranty information with the O&M manuals.
- C. The manufacturer shall provide a minimum five-year warranty on all hardware devices supplied and installed. Warranty coverage shall begin on the date of shipment.

- D. The hardware warranty shall cover repair or replacement any defective products within the warranty period.

1.8 Maintenance & Sustainability

- A. The equipment supplier shall provide factory trained technicians for programming, installation support and training of personnel. The manufacturer shall make available to the owner new parts, upgrades, and/or replacements available for a minimum of 5 years following installation.

PART 2 - PRODUCTS

2.1 Manufacturers

- A. Systems manufactured by the following manufacturers may be considered provided they meet the requirements of this specification and provide for the quality, functionality, and performance specified herein.
- B. Basis of Design System: Acuity Controls - nLight
- C. Acceptable equals to the Basis of Design: Payne-Sparkman, Watt Stopper, Hubbell Building Automation, Lutron, Leviton, Encellium, Square-D, GE, and Crestron.
- D. Listing of a manufacturer as acceptable does not in any way relieve the contractor from responsibility for meeting all specification requirements.

2.2 System Compliance

- A. System components shall comply with UL 916 and UL 924 standards where applicable.
- B. System components shall comply with CFR Title 47, Part 15 standards where applicable.
- C. All equipment shall be installed and connected in compliance with NFPA 70.

2.3 System Performance Requirements

- A. System Architecture
 - 1. System shall have an architecture that is based upon three main concepts: (1) networkable intelligent lighting control devices, (2) standalone lighting control zones using distributed intelligence, (3) optional system backbone for remote, time based and global operation between control zones.
 - 2. Intelligent lighting control devices shall have individually addressable network communication capability and consist of one or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining one or more of these

components into a single device enclosure shall be permissible so as to minimize overall device count of system.

3. System must be capable of interfacing directly with networked luminaires such that either low voltage network cabling or wireless RF communication is used to interconnect networked luminaires with control components such as sensors, switches and system backbone (see Control Zone Characteristics sections for each type of network connection, wired or wireless).
4. Lighting control zones consisting of one or more networked luminaires and intelligent lighting control devices and shall be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wallstations without requiring connection to a higher level system backbone; this capability is referred to as “distributed intelligence.”
 - a. Lighting control zones (wired and wireless) of at least 128 devices per zone shall be supported.
5. The system shall be capable of providing individually addressable switching and dimming control of the following: networked luminaires, control zones, and relay and dimming outputs from centralized panels to provide design flexibility appropriate with sequence of operations required in each project area or typical space type.
6. Networked luminaires and intelligent lighting control devices shall support individual (unique) configuration of device settings and properties.
7. Networked luminaires and intelligent lighting control devices shall have distributed intelligence programming stored in non-volatile memory such that following any loss of power the lighting control zones shall operate according to their defined default settings and sequence of operations.
8. Lighting control zones to be capable of being networked with a higher level system backbone to provide time based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software interface.
9. The system will include one or more system controllers that provide time-based control and global system control across multiple control zones and backbone network segments. The system controller also provides a means of connecting the lighting control system to a system software interface and building management systems via BACnet/IP protocol.
10. The system may include “communication bridge” devices that route communication from lighting control zones (wired or wireless) to and from the system controller, for purposes of decreasing system wiring requirements.
11. All system devices will support remote firmware update, such that physical access to each device is not necessary, for purposes of upgrading functionality at a later date.
12. The system shall be capable of interfacing directly with building BAS systems, coordinate type and protocol with the owner and provide accordingly.

B. Wired Networked Control Zone Characteristics

1. Connections to devices within a wired networked lighting control zone and to backbone components shall be with a single type of low voltage network cable, which shall be compliant with low voltage specifications or higher. To prevent

wiring errors and provide cost savings, the use of mixed types of low voltage network cables shall not be permitted.

2. Devices in an area shall be connected via a “daisy-chain” topology; requiring all individual networked devices to be connected back to a central component in a “hub-and-spoke” topology shall not be permitted, so as to reduce the total amount of network cable required for each control zone.
3. System shall provide the option of having pre-terminated plenum rated low voltage network cabling supplied with hardware so as to reduce the opportunity for improper wiring and communication errors during system installation.
4. Following proper installation and provision of power, all networked devices connected together with low voltage network cable shall automatically form a functional lighting control zone without requiring any type of programming, regardless of the programming mechanism (e.g., software application, handheld remote, pushbutton). The “out of box” default sequence of operation is intended to provide typical sequence of operation so as to minimize the system startup and programming requirements and to also have functional lighting control operation prior to system startup and programming.
5. Once software is installed, system shall be able to automatically discover all connected devices without requiring any provisioning of system or zone addresses.
6. All networked devices shall have the ability to detect improper communication wiring and blink its LED in a specific cadence as to alert installation/startup personnel.
7. Networked control devices intended for control of egress and/or emergency light sources shall not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
 - a. Low-Voltage power sensing: These devices shall automatically provide 100% light level upon detection of loss of power sensed via the low voltage network cable connection.
 - b. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss of power sensed via line voltage connections.

C. Wireless Mesh Networked Control Zone Characteristics

1. No wired control connections between wireless networked devices shall be required.
2. Wireless networked devices shall communicate via radio frequency of 2.4 GHz using a standards-based wireless mesh networking protocol.
3. Wireless network shall be self-healing, such that optimum routing paths between devices are automatically established or restored if any nodes are respectively added to or removed from the wireless network.

4. Wireless network communication shall support uniform and instant response such that all luminaires in a lighting control zone respond immediately and synchronously in response to a sensor or wallstation signal.
5. To support the system architecture requirement for distributed intelligence, wireless network communication shall support communication of control signals from sensors and wallstations to networked luminaires and wireless load control devices, without requiring any communication, interpretation, or translation of information through a backbone device such as a wireless access point, communication bridge or gateway.
6. All wireless communication shall be encrypted using the 128-bit Advanced Encryption Standard (AES).
7. Wet listed wireless networked luminaires and wireless sensing devices shall be offered, so as to support a wide variety of lighting control applications.
8. Accounting for typical environmental conditions and building construction materials encountered within parking garage environments or within high-bay applications in industrial, warehouse, gymnasium environments, wireless mesh networked devices shall be capable of communicating to at least 30 ft spacing between luminaires with embedded wireless transceivers, and shall be capable of communicating to at least 60 ft spacing between wireless networked devices installed external to luminaire housings or other enclosures.
 - a. Wireless networked devices shall have a line-of-sight communication range of at least 1000 ft under ideal environmental conditions.
9. Networked control devices intended for control of egress and/or emergency light sources shall not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
 - a. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard, and shall automatically close the load control relay(s) and provide 100% light output upon detection of loss or interruption of power sensed via line voltage connections.

D. Wireless Dual Band Networked Control Zone Characteristics

1. No wired connections between wireless networked devices shall be required.
2. Wireless networked devices shall communicate using two radio frequencies, 900 MHz and 2.4 GHz.
3. Multiple wireless networking protocols shall be supported:
 - a. A standards based, distributed star topology type of protocol for 900 MHz communication, so as to support indoor and outdoor lighting control applications.
 - b. A Bluetooth standard protocol for 2.4 GHz communication that supports direct connection to a smartphone and tablet device, so as to support device configuration and control applications without requiring the use of a system backbone.

4. Wireless network shall be self-healing, such that optimum communication between devices is automatically established or restored if any nodes are respectively added to or removed from the wireless network.
5. Wireless network communication shall support uniform and instant response such that all luminaires in a lighting control zone respond immediately and synchronously in response to a sensor or wallstation signal.
6. To support the system architecture requirement for distributed intelligence, wireless network communication shall support communication of control signals from sensors and wallstations to networked luminaires and wireless load control devices, without requiring any communication, interpretation, or translation of information through a backbone device such as a wireless access point, communication bridge or gateway.
7. All wireless communication shall support the following five tiers of security measures, so as to safely support Internet-connected applications.
 - a. Application Data Encryption
 - b. Mutual Entity Authentication
 - c. Message Authentication
 - d. Mutual Entity Authentication
 - e. Application Data Encryption
8. Accounting for typical environmental conditions and building construction materials encountered within commercial indoor lighting environments, wireless mesh networked devices shall be capable of communicating to at least 300' spacing between luminaires with embedded wireless transceivers.
9. Wireless networked devices shall have a line-of-sight communication range of at least 1000 ft. under ideal environmental conditions.

E. System Integration Capabilities

1. The system shall have the ability to interface with third party building management systems (BMS) to support two-way communication using the industry standard BACnet/IP or BACnet/MSTP protocols. The following system integration capabilities shall be available via BACnet/IP and BACnet/MSTP protocols:
 - a. The system shall support control of individual devices, including, but not limited to, control of relay and dimming output. All system devices shall be available for control.
 - b. The system shall support reading of individual device status information, including but not limited to, relay state, dimming output, power measurement, occupancy sensor status, and photocell sensor states or readings. All system devices shall be available for polling for devices status.
 - c. The system shall support activation of pre-defined system Global Profiles (see Supported Sequence of Operations for further definition of Global Profile capabilities).

F. Supported Sequence of Operations

1. The following characteristics and performance requirements shall apply to wired and wireless control zones provided by the system.

2. Control Zones
 - a. Networked luminaires and intelligent lighting control devices installed in an area (also referred to as a group of devices) shall be capable of transmitting and tracking occupancy sensor, photocell sensor, and manual switch information within at least 48 unique control zones to support different and reconfigurable sequences of operation within the area. These shall also be referred to as local control zones.
 - b. Networked luminaires and intelligent lighting control devices located in different areas shall be able to transmit and track occupancy, photocell, and switch information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. These shall also be referred to as global control zones.
3. Wallstation Capabilities
 - a. Wallstations shall be provided to support the following capabilities:
 - 1) On/Off of a local control zone and global control zone simultaneously, as required.
 - 2) Continuous dimming control of light level of a local control zone and global control zone simultaneously, as required.
 - 3) Preset Scenes that can activate a specific combination of light levels across multiple local and global channels, as required.
 - 4) Profile Scenes that can modify the sequence of operation for the devices in the area (group) in response to a button press. This capability is defined as supporting “Local Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage. Parameters that shall be configurable and assigned to a Local Profile include light level, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wallstations.
 - b. 3-way / multi-way control: multiple wallstations shall be capable of controlling the same local and global control zones, so as to support “multi-way” switching, dimming, preset scene, and profile scene control.
4. Occupancy Sensing Capabilities
 - a. Local and global control: Occupancy sensors shall be configurable to control a local and global zone simultaneously, as required.
 - b. Multi-sensor control: multiple occupancy sensors shall be capable of controlling the same local and global control zones. This capability combines occupancy sensing coverage from multiple sensors without consuming multiple control zone addresses.
 - c. System shall support the following types of occupancy sensing sequence of operations:
 - 1) On/Off Occupancy Sensing
 - 2) Partial-On Occupancy Sensing
 - 3) Partial-Off Occupancy Sensing
 - 4) Vacancy Sensing (Manual-On / Automatic-Off)
 - d. On/Off, Partial-On, and Partial-Off Occupancy Sensing modes shall function according to the following sequence of operation:
 - 1) Occupancy sensors automatically turn lights on to a designated level when occupancy is detected. To support fine tuning of Partial-On

- sequences the designated occupied light level shall support at least 100 dimming levels.
- 2) Occupancy sensors automatically turn lights off or to a dimmed state(Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level shall support at least 100 dimming levels.
 - 3) To provide additional energy savings the system shall also be capable of combining Partial-Off and Full-Off operation by dimming the lights to a designated level when vacant and then turning the lights off completely after an additional amount of time.
 - 4) Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under Photocell Sensing Capabilities.
 - 5) The use of a wallstation shall change the dimming level or turn lights off as selected by the occupant. The lights shall remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.
- e. Vacancy Sensing mode (also referred to as Manual-On / Automatic-Off) shall function according to the following sequence of operation:
- 1) The use of a wallstation is required turn lights on. The system shall be capable of programming the zone to turn on to either to a designated light level or the previous light level. Initially occupying the space without using a wallstation shall not result in any change in light level.
 - 2) Occupancy sensors shall automatically turn lights off when vacancy occurs is detected. To provide an enhanced occupant experience the system shall also be capable of dimming the lights when vacant and then turning the lights off completely after an additional amount of time.
 - 3) To minimize occupant impact in case the area or zone is still physically occupied following dimming or shutoff of the lights due to detection of vacancy, the system shall support an “automatic grace period” immediately following detection of vacancy, during which time any detected occupancy shall result in the lights reverting to the previous level. After the grace period has expired, the use of a wallstation is required to turn lights on.
 - 4) Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under Photocell Sensing Capabilities.
 - 5) At any time, the use of a wallstation shall change the dimming level or turn lights off as selected by the occupant. The lights shall remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.

- 6) To accommodate different types of environments, vacancy time delays before dimming or shutting off lights shall be specifiable for control zones between 15 seconds to 2 hours.
- f. Photocell Sensing Capabilities (Automatic Daylight Sensing)
 - 1) Photocell sensing devices shall be configurable to control a local and global zone simultaneously, as required.
 - 2) The system shall support the following types of photocell-based control:
 - a) On/Off: The control zone is automatically turned off if the photocell reading exceeds the defined setpoint and automatically turned on if the photocell reading is below the defined setpoint. A time delay or adaptive setpoint adjustable behavior may be used to prevent the system from exhibiting nuisance on/off switching.
 - b) Continuous Dimming: The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response shall be configurable to adjust the photocell setpoint and dimming rates.
- g. Schedule and Global Profile Capabilities
 - 1) The system will be capable of automatically modifying the sequence of operation for selected devices in response to any of the following: a time-of-day schedule, contact closure input state, RS-232/RS-485 command, BACnet input command, and demand response signal. This capability is defined as supporting “Global Profiles” and is used to dynamically optimize the occupant experience and lighting energy usage.
 - 2) Scheduling. Global profiles may be scheduled with the following capabilities:
 - a) Global Profiles shall be stored within and executed from the system controller (via internal timeclock) such that a dedicated software host or server is not required to be online to support automatic scheduling and/or operation of Global Profiles.
 - b) Global Profile time of day schedules shall be capable of being given the following recurrence settings: daily, specific days of week, every “n” number of days, weekly, monthly, and yearly. Lighting control profile schedules shall support definition of start date, end date, end after “n” recurrences, or never ending. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
 - c) Global Profiles shall be capable of being scheduled to run according to timed offsets relative to sunrise or sunset. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
 - d) Blink warning and timed extension capabilities. At the end of a scheduled period, the system shall be capable of providing a visible “blink warning” 5 minutes prior to the end of the schedule. Wallstations may be programmed to provide timed overrides that turn the lights on for an additional period of time. Timed override duration shall be programmable for each individual device, zone of

- devices, or customized group of devices, ranging from 5 minutes to 12 hours.
- e) Software management interface shall be capable of displaying a graphic calendar view of profile schedules for each control zone.
- 3) **System Global Profiles shall have the following additional capabilities:**
 - a) Global Profiles shall be capable of being manually activated directly from the system controller, specially programmed input devices, and software management interface.
 - b) Global Profiles shall be selectable to apply to a single device, zone of devices, or customized group of devices.
 - c) Parameters that shall be configurable and assigned to a Global Profile include light level, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wallstations.
 - d) A backup of Local and Global Profiles shall be stored on the software's host server such that the Profile backup can be applied to a replacement system controller or wallstation.
- h. **Automated demand response capabilities.** Profiles created for automated demand response events shall support automatic reduction of light level to programmable values. At least four levels of demand response profiles shall be supported by the system.

2.4 System Software Interfaces

A. Management Interface

1. System will provide a web-based management interface that provides remote system control, live status monitoring, and configuration capabilities of lighting control settings and schedules.
2. Management interface must be compatible with industry-standard web browser clients, including, but not limited to, Microsoft Internet Explorer®, Apple Safari®, Google Chrome®, Mozilla Firefox®.
3. Management interface shall require all users to login with a User Name and Password, and shall support creation of at least 100 unique user accounts.
4. Management interface shall support at least three permission levels for users: read-only, read & change settings, and full administrative system access.
5. Management interface shall be capable of restricting read-only and read & change access for user accounts to specific devices within the system.
6. All system devices shall be capable of being given user-defined names.
7. The following device identification information shall be displayed in the Management interface: model number, model description, serial number, manufacturing date code custom label(s), and parent network device.
8. Management interface shall be able to read the live status of a networked luminaire or intelligent control device and shall be capable of displaying luminaire on/off status, dim level, power measurement, device temperature, PIR occupancy sensor status, microphonic occupancy sensor status, remaining occupancy time delay, photocell reading, and active Scenes or Profiles.

9. Management interface shall be able to read the current active settings of a networked luminaire or intelligent control device and shall be capable of displaying dimming trim levels, occupancy sensor and photocell enable/disable, occupancy sensor time delay and light level settings, occupancy sensor response (normal or vacancy), and photocell setpoints and transition time delays.
10. Management interface shall be able to change the current active settings and also default settings for an individual networked luminaire or intelligent control device.
11. Management interface shall be capable of applying settings changes for a zone of devices or a group of selected devices using a single “save” action that does not require the user to save settings changes for each individual device.
12. A printable network inventory report shall be available via the management interface.
13. A printable report detailing all system profiles shall be available via the management interface.
14. All sensitive information stored by the software shall be encrypted.
15. All system software updates must be available for automatic download and installation via the Internet.

B. Historical Database and Analytics Interface

1. System shall provide a historical database that stores device operational history and calculates energy usage for all networked luminaires and intelligent control devices.
2. System shall be capable of reporting lighting system events and performance data back to the historical database for display and analysis.
3. Historical database shall be capable of recording historical data for up to 20,000 networked devices for a period of at least 1 calendar year.
4. An “Energy Scorecard” shall be displayed that shows calculated energy savings in dollars, kWh, or CO₂.
5. Software shall calculate the allocation of energy savings to different control measures (occupancy sensors, photocells, manual switching, etc.).
6. Energy savings data shall be calculated for the system as a whole or for individual zones.
7. A time scaled graph showing all relay transitions shall be presented.
8. A time scaled graph showing a zones occupancy time delay shall be presented
9. A time scaled graph showing the total light level shall be presented.
10. User shall be able to customize the baseline run-time hours for a space.
11. User shall be able to customize up to four time-of-day billing rates and schedules.
12. Historical data shall be exportable from the Historical Database via a “CSV” type of file format.

C. Visualization Interfaces

1. System will provide a web-based visualization interface that displays graphical floorplan.
2. Graphical floorplan shall offer the following types of system visualization:

- a. Full Device Option - A master graphic of the entire building, by floor, showing each control device installed in the project with zones outlined to include but not be limited to the following:
 - 1) Controls embedded light fixtures
 - 2) Controls devices not embedded in light fixtures
 - 3) Daylight Sensors
 - 4) Occupancy Sensors
 - 5) Wall Switches and Dimmers
 - 6) Scene Controllers
 - 7) Networked Relays
 - 8) Bridges
 - 9) System Controllers
 - 10) Panels
 - 11) Zone outlines
 - b. Zone Only Option - A master graphic of the entire building, by floor, showing control zones:
 - 1) Zones outlined
 - c. Allow for pan and zoom commands so smaller areas can be displayed on a larger scale simply by panning and zooming each floor's master graphic.
 - d. A mouse click on any control device shall display the following information (as applicable):
 - 1) The device catalog number.
 - 2) The device name and custom label.
 - 3) Device diagnostic information.
 - 4) Information about the device status or current configuration is available with an additional mouse click.
3. Personal Control Applications
- a. Software interface shall support personal control software applications that provide user- specific control of individual luminaires, control zones, and scene presets.
 - b. Personal control applications shall support control of dimming output or definition of dimming presets for luminaires and devices that are dimmable.
 - c. The system administrator shall be capable of defining personal control permissions for each user account.
 - d. Software interface shall provide a Microsoft Windows® operating system taskbar application for personal lighting control.
 - e. Software interface shall provide an Apple iOS® operating system application (supported by mobile phones and mobile tablet devices) for personal lighting control.
4. Smartphone Programming Interface for Wired Devices
- a. Application interface shall be provided for both Apple iOS® and Android operating systems that allows configuration of lighting control settings.
 - b. The application shall support the configuration of wired networked control devices via a Bluetooth® Low Energy (BLE) Programming Device.
 - 1) Application shall support a security pin-code to access the zone of lighting control devices.

- 2) The application shall provide indication of signal strength where multiple Bluetooth Low Energy Programming Devices are available for configuration.
 - 3) The application shall indicate the number of wired networked control devices. The application shall indicate the number of wired networked control devices.
5. Programming capabilities through the application shall include, but not be limited to, the following:
 - a. Switch/occupancy/photosensor group configuration
 - b. Manual/automatic on modes
 - c. Turn-on dim level
 - d. Occupancy sensor time delays
 - e. Dual technology occupancy sensors sensitivity
 - f. Trim level settings

2.5 System Backbone and System Integration Equipment

A. IP nLight ECLYPSE™ System Controller (IP-NE-CTRL)

1. System Controller shall be multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
2. System Controller shall have 32-bit microprocessor operating at a minimum of 1 GHz.
3. System Controller shall have minimum of 512MB memory, with a minimum of 4GB non-volatile flash, to support its own operating system and databases.
4. System Controller shall perform the following functions:
 - a. Facilitation of global network communication between different areas and control zones.
 - b. Time-based control of downstream wired and wireless network devices.
 - c. Linking into an Ethernet network.
 - d. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
 - e. Connection to various software interfaces, including management interface, historical database and analytics interface, visualization interface, and personal control applications.
5. System Controller shall have an integral web server to support configuration, diagnostics and hosting of software interfaces.
6. Device shall have option for a graphical touch screen to support configuration and diagnostics.
7. Device shall have three RJ-45 networked lighting control ports for connection to any of the following:
 - a. The graphical touch screen
 - b. Wired communication bridges
 - c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port)
8. Device shall be capable of communicating with wireless mesh network bridges and software interfaces via LAN connection.

9. Device shall automatically detect all networked devices connected to it, including those connected to wired and wireless communication bridges.
10. Device shall have a standard internal time clock.
11. Device shall have 2 switched RJ-45 10/100 BaseT Ethernet ports for local area network (LAN) connection
 - a. Ethernet connection shall support daisy chain wiring to other lighting control system LAN devices, such as other system controllers and wireless mesh networked communication bridges.
 - b. Ethernet connection shall support IPv4 and shall be capable of using a dedicated static or DHCP assigned IP address.
12. Device shall have 2 x USB 2.0 Expansion ports for
 - a. 802.11 Wi-Fi Adapter enabling wireless connectivity including:
 - 1) Hot Spot
 - 2) Access Point
 - 3) Client
 - 4) Spanning Tree Protocol
13. Each System Controller shall be capable of managing and operating at least 1500 networked devices (wired or wireless).
 - a. Multiple System Controllers may be networked together via LAN connection to scale the system up to 20,000 networked devices.
14. System Controller shall support BACnet/IP and BACnet/MSTP protocols to directly interface with BMS and HVAC equipment without the need for additional protocol translation gateways.
 - a. BACnet/MSTP shall support up to minimum of 50 additional BACnet MS/TP controllers in addition to the Expansion I/O modules.
 - b. BACnet/MSTP shall support 9600 to 115200 baud.
 - c. System Controller shall be BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
15. Shall contain a “FIPS 140-2 Level 1 Compliant” cryptographic module.

B. Open ADR Interface

1. System shall provide an interface to Open ADR protocol Demand Response Automation Servers (DRAS) typically provided by local electrical utility.
2. Open ADR interface shall meet all of the requirements of Open ADR 2.0a Virtual End Nodes (VEN), including:
 - a. Programmable with the account information of the end-user’s electrical utility DRAS account credentials.
3. Open ADR interface shall support the activation of system profiles configured for each of the automated demand response levels defined in the utility demand response program.

2.6 Wired Networked Devices

A. Wired Networked Wall Switches, Dimmers, Scene Controllers

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.

2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
5. Devices with mechanical push-buttons shall be made available with custom button labeling.
6. Wall switches & dimmers shall support the following device options:
 - a. Number of control zones: 1, 2 or 4
 - b. Control Types Supported: On/Off or On/Off/Dimming
 - c. Colors: Ivory, White, Light Almond, Gray, Black, Red
7. Scene controllers shall support the following device options:
 - a. Number of scenes: 1, 2 or 4
 - b. Control Types Supported:
 - 1) On/Off
 - 2) On/Off/Dimming
 - 3) Preset Level Scene Type
 - 4) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene
 - 5) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones
 - 6) Colors: Ivory, White, Light Almond, Gray, Black, Red

B. Wired Networked Graphic Wall Stations

1. Device shall surface mount to single-gang switch box.
2. Device shall have a 3.5" full color touch screen.
3. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply.
4. Device shall have a micro-USB style connector for local computer connectivity.
5. Communication shall be over standard low voltage network cabling with RJ-45 connectors.
6. Device shall enable user supplied screen saver image to be uploaded within one of the following formats: jpg, png, gif, bmp, tif.
7. Device shall enable configuration of all switches, dimmers, and lighting preset scenes via password protected setup screens.
8. Graphic wall stations shall support the following device options:
 - a. Number of control zones: Up to 16
 - b. Number of scenes: Up to 16
 - c. Colors: Ivory, White, Light Almond, Gray, Black
9. Provide two(2) manual control stations for lighting override of the networked lighting controls location as coordinated with Architect/University/Engineer.

C. Wired Networked Auxiliary Input / Output (I/O) Devices

1. Devices shall be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a ½ in knockout.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. Auxiliary Input/Output Devices shall be specified as an input or output device with the following options:
 - a. Contact closure input
 - 1) Input shall be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, ramp light level up or down, or toggle lights on/off.
 - b. 0-10V analog input
 - 1) Input shall be programmable to function as a daylight sensor.
 - c. RS-232/RS-485 digital input
 - 1) Input supports activation of local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
 - d. 0-10V dimming control output, capable of sinking up to 20mA of current
 - 1) Output shall be programmable to support all standard sequence of operations supported by system.

D. Wired Networked Occupancy and Photosensors

1. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
2. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.
3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.
4. Dual technology sensors shall have one of its two technologies not require motion to detect occupancy. Acceptable dual technology includes PIR / Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR / Ultrasonic) shall not be acceptable.
5. All sensing technologies shall be acoustically passive, meaning they do not transmit sound waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.
6. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
7. All sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.

8. Sensor programming parameter shall be available and configurable remotely from the software and locally via the device push-button.
9. Network system shall have ceiling, fixture, recessed & corner mounted sensors available, with multiple lens options available customized for specific applications.
10. Sensors shall be available with zero or one integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).
11. Sensors shall be available with one or two occupancy “poles”, each of which provides a programmable time delay.
12. Sensors shall have optional features for photosensor/daylight override, dimming control, and low temperature/high humidity operation.
13. Photosensor shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
14. Photosensor and dimming sensor’s set-point and deadband shall be automatically calibrated through the sensor’s microprocessor by initiating an “Automatic Set-point Programming” procedure. Min and max dim settings as well as set-point may be manually entered.
15. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
16. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The secondary daylight zone shall be capable of being controlled as an “offset” from the primary zone.

E. Wired Networked Wall Switch Sensors

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All wall switch sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical push-buttons shall provide tactile user feedback.
 - a. Wall switches sensors shall support the following device options:
 - b. User Input Control Types Supported: On/Off or On/Off/Dimming
 - c. Occupancy Sensing Technology: PIR only or Dual Tech acoustic
 - d. Daylight Sensing Option: Inhibit Photosensor
 - e. Colors: Ivory, White, Light Almond, Gray
5. Wired Networked Embedded Sensors
 - a. Network system shall have embedded sensors consisting of occupancy sensors and/or dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
 - b. Occupancy sensor detection pattern shall be suitable for 7.5 ft. to 20 ft. mounting heights.
 - c. Embedded sensors shall support the following device options:
 - 1) Occupancy Sensing technology: PIR only or Dual Tech acoustic

- 2) Daylight Sensing Option: Occupancy only, Daylight only, or combination Occupancy/Daylight sensor
6. Wired Networked Power Packs and Secondary Packs
 - a. Power Packs shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.
 - b. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC) and carry a plenum rating.
 - c. Secondary Packs shall incorporate the relay and 0-10 VDC or line voltage dimming output, but shall not be required to contribute system power.
 - d. Power Supplies shall provide system power only, but are not required to switch line voltage circuit.
 - e. Auxiliary Relay Packs shall switch low voltage circuits only, capable of switching 1 amp at 40 VAC/VDC (resistive only).
 - f. Communication shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors. Secondary packs shall receive low voltage power via standard low voltage network cable.
 - g. Power Pack programming parameter shall be available and configurable remotely from the software and locally via the device push-button.
 - h. Power Pack shall securely mount to junction location through a threaded ½ in chase nipple or be capable of being secured within a luminaire ballast/driver channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
 - i. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
 - j. Power/Secondary Packs shall be available with the following options:
 - 1) Power Pack capable of full 16-Amp switching of all normal power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current.
 - 2) Secondary Pack with UL924 listing for switching of full 16-Amp Emergency Power circuits, with optional 0-10V dimming output capable of up to 100mA of sink current.
 - 3) Power and Secondary Packs capable of full 20-Amp switching of general purpose receptacle (plug-load) control.
 - 4) Secondary Pack capable of full 16-Amp switching of all normal power lighting load types.
 - 5) Secondary Pack capable of 5-Amps switching and dimming 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
 - 6) Secondary Pack capable of 5-Amps switching and dimming of 120/277 VAC magnetic low voltage transformers.

- 7) Secondary Pack capable of 4-Amps switching and dimming of 120 VAC electronic low voltage transformers.
 - 8) Secondary Pack capable of louver/damper motor control for skylights.
 - 9) Secondary Pack capable of providing a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
 - 10) Secondary Pack capable of switching 1 amp at 40 VAC/VDC (resistive only) with the intent to provide relay signal to auxiliary system (e.g. BMS).
 - 11) Power Supply capable of providing auxiliary bus power (no switched or dimmed load).
7. Wired Networked Luminaires
- a. Networked luminaire shall have a mechanically integrated control device.
 - b. Networked LED luminaire shall have two RJ-45 ports available (via control device directly or incorporated RJ-45 splitter).
 - c. Networked LED luminaire shall be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).
 - d. Networked LED luminaire shall provide low voltage power to other networked control devices (excluding EMG and wireless versions).
 - e. System shall be able to turn on/off specific LED luminaires without using a relay, if LED driver supports “sleep mode”.
 - f. System shall be able to maintain constant lumen output over the specified life of the LED luminaire (also called lumen compensation) by automatically varying the dimming control signal to account for lumen depreciation.
 - 1) System shall indicate (via a blink warning) when the LED luminaire is no longer able to compensate for lumen depreciation.
8. Wired Networked Relay and Dimming Panel
- a. Relay and dimming panel shall be available with 4, 8, 12 or 16 individual Field Configurable Relays (FCR) per panel, with an equal number of individual 0-10V dimming outputs.
 - b. Standard relays used shall have the following required properties:
 - 1) Configurable in the field to operate with single-, double-, or triple-pole relay groupings.
 - 2) Configurable in the field to operate with normally closed or normally open behavior.
 - 3) Provides visual status of current state and manual override control of each relay.
 - 4) Listed for the following minimum ratings:
 - a) 40A@120-480VAC Ballast
 - b) 16A@120-277VAC Electronic
 - c) 20A@120-277VAC Tungsten
 - d) 20A@48VDC Resistive
 - e) 2HP @ 120VAC,
 - f) 3HP @ 240-277VAC
 - g) 65kA SCCR @ 480VAC
 - c. 0-10 dimming outputs shall support a minimum of 100mA sink current per output.
 - d. Relay and dimming outputs shall be individually programmable to support all standard sequence of operations as defined in this specification.

- e. Panel shall be UL924 listed for control of emergency lighting circuits.
- f. Panel shall power itself from an integrated 120-277VAC or 347VAC supply.
- g. Panel shall provide a configurable low-voltage sensor input with the following properties:
 - 1) Configurable to support any of the following input types:
 - a) Indoor Photocell
 - b) Outdoor Photocell
 - c) Occupancy Sensor
 - d) Contact Closure
 - 2) Low voltage sensor input shall provide +24VDC power for the sensor so that additional auxiliary power supplies are not required.
 - 3) Sensor input supports all standard sequence of operations as defined in this specification.
- h. Panel shall provide a contact closure input that acts as a panel override to activate the normally configured state of all relays (i.e., normally open or normally closed) in the panel. This input is intended to provide an interface to alarm systems, fire panels, or BMS system to override the panel.
- i. Panel shall supply current limited low voltage power to other networked devices connected via low voltage network cable.
- j. Panel shall be available with NEMA 1 rated enclosure with the following properties:
 - 1) Surface-mounted or flush-mounted enclosure back box
 - 2) Screw-fastened cover or hinged cover with keyed lock
- k. Panel shall be rated from 32-122 °F.
- 9. Wired Networked Bluetooth® Low Energy Programming Device
 - a. Device shall be plenum rated and be inline wired, screw mountable.
 - b. Communication and low voltage power shall be delivered to device via standard low voltage network cabling with RJ-45 connectors.
 - c. Bluetooth Low Energy connection shall allow connection from smartphone application for programming device settings within the local daisy-chain zone (see list of available settings in section, 2.4-System Software Interfaces, Sub-section .5).
 - 1) Device shall provide visual indication of remote Bluetooth connection via LED integrated into device enclosure such that it is visible from all angles while the zone is being programmed.
- 10. Wired Networked Communication Bridge
 - a. Device shall surface mount to a standard 4" x 4" square junction box.
 - b. Device shall have 8 RJ-45 ports for connection to lighting control zones (up to 128 devices per port), additional network bridges, and System Controller.
 - c. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to System Controller.
 - d. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply, or powered via low voltage network connections from powered lighting control devices (e.g. power packs).
 - e. Wired Bridge shall be capable of redistributing power from its local supply and connected lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of

power to a particular area to be less impactful on network lighting control system.

2.7 Wireless Mesh Networked Devices

A. Wireless Mesh Networked Sensor Interface

1. The wireless sensor interface shall integrate industry standard low voltage switching devices and contact closure outputs into the control network.
2. The device interface shall have a universal power supply that operates at 120, 208, 240 or 277 VAC.
3. The device shall be listed under the UL 916 standard to allow field installation.
4. The device interface shall be suitable for mounting onto an electrical junction box and have UL 2043 listing for mounting in a plenum.
5. The device interface shall provide 2 low voltage sensing input channels suitable for connecting to momentary contact wall switches and dry contact outputs from other systems.
6. The device shall provide at least 100 mA of output power at 24VDC for connection to external input devices.
7. The device shall be capable of broadcasting the following manual wall control commands: on, off, and adjust dim level.

B. Wireless Mesh Networked Light Controllers

1. The wireless light controller shall have a line voltage relay and 0-10V dimming output suitable for control of commercial and industrial lighting including fluorescent, HID, induction and LEDs.
2. Device shall have a form factor similar to a slim European-style ballast, which is intended for installation directly inside the ballast channel of a fixture.
3. Device shall have an integrated internal antenna suitable for embedding inside of a commercial and industrial luminaire while maintaining reliable wireless communication for typical luminaire spacing in commercial and industrial applications (see Wireless Mesh Network Control Zone Characteristics). An external antenna attached to the luminaire shall not be allowed.
4. The wireless light controller shall have a universal power supply that operates at 120, 208, 240 or 277VAC.
5. The device shall be listed under the UL 916 standard to allow field installation.
6. Each wireless light controller shall provide measurement capability of the amperage, voltage, wattage, and watt-hours of its controlled lighting.
 - a. Amperage and current measurements shall be accurate to +/- 2%.
 - b. Wattage measurement shall account for power factor of the load, so that real active power is reported by the system instead of apparent power.
7. The wireless light controller shall have a connector for an optional digital occupancy sensor and photocell.
8. Wireless light controller shall have the following relay options:
 - a. Normal power, 5A relay
 - b. Emergency power, 5A relay (UL924 listed)

- c. Emergency power, no relay (UL924 listed); still provides 0-10V dimming control and power measurement of the load while providing unswitched and “fail-on” operation of the lighting load.

C. Wireless Mesh Networked Digital Sensor Attachments

1. Digital sensor attachments provide integrated digital occupancy sensing and digital photocell sensor.
2. Devices shall connect directly to the wireless light controller and shall be suitable for embedding into the enclosure of a luminaire.
3. IP-rated digital sensor attachments shall be provided that maintain wet-location capability of a luminaire.
4. Device shall have software-adjustable sensitivity of PIR occupancy sensor.
5. Photocell shall be suitable for closed and open loop applications.
6. Device shall have a user button that may be used to provide diagnostic and factory-default reset capabilities.
7. Digital sensor attachment shall have the following form factors and lens types:
 - a. IP rated, high-mounting height (15-45 ft.), 360° PIR with minimum 15 ft. detection radius, and photocell.
 - b. IP rated, low-mounting height (up to 15 ft.), extended range 360° PIR with up to 30 ft. detection radius and photocell.
 - c. Micro-sensor form factor, 360° PIR and photocell.

D. Wireless Mesh Networked Sensor-Controllers

1. Sensor-Controllers shall integrate the following functions in to a single enclosure:
 - a. Line voltage relay and 0-10V dimming control of a lighting load.
 - b. Power measurement of lighting load (voltage, amperage, watts, and watt-hours).
 - c. Digital PIR occupancy sensor with software-adjustable sensitivity.
 - d. Digital photocell sensor suitable for closed and open loop applications.
 - e. User button used to provide diagnostic and factory-default reset capabilities.
2. Sensor-Controllers shall mount to luminaires or junction boxes with a secured chase nipple suitable for ½ in KO mounting holes.
3. Sensor-Controllers shall have optional IP-rated enclosures for wet location applications.
4. Sensor-Controllers shall be the following enclosures, relay options, and lens types:
 - a. Enclosure
 - 1) Damp location, including optional offset bracket to locate the sensor lens to avoid detection cutoff from the luminaire.
 - 2) Wet location, IP65 rated enclosure or better, including optional back heights and nipple extension lengths to locate the sensor lens to avoid detection cutoff from the luminaire.
 - b. Relay Options
 - 1) Normal power, 5A relay.
 - 2) Emergency power, 5A relay (UL924 listed).

- 3) Emergency power, no relay (UL924 listed); still provides 0-10V dimming control and power measurement of the load while providing unswitched and “fail-on” operation of the lighting load.
- c. Lens Types
 - 1) “No lens,” which has no occupancy sensing or photocell sensing capability but allows the Sensor-Controller to be used purely as an externally mounted lighting control device.
 - 2) IP rated, high-mounting height (15-45 ft.), 360° PIR with minimum 15 ft. detection radius, and photocell.
 - 3) IP rated, high-mounting height (4.6-13.7 m), 360° PIR with minimum 4.6 m detection radius, and photocell.
 - 4) IP rated, low-mounting height (up to 15 ft.), extended range 360° PIR with up to 30 ft. detection radius and photocell.
 - 5) IP rated, low-mounting height (up to 4.6 m), extended range 360° PIR with up to 9.1 m detection radius and photocell.
5. Wireless Mesh Networked Luminaires
 - a. Networked luminaire shall have a mechanically integrated control device.
 - b. Networked LED luminaire shall be capable of communicating wirelessly to other networked luminaires or intelligent control devices (sensors, photocells, switches, dimmers).
6. Wireless Mesh Network Communication Bridge
 - a. A communication bridge device shall be provided that interfaces with the System Controller via LAN connection and interfaces with wireless mesh networked devices via an integrated 2.4 GHz transceiver.
 - b. Device shall provide an option to be powered from a Power-over-Ethernet connection conforming to the IEEE 802.3af standard.
 - c. Device shall provide an option to be powered from 120VAC electrical outlet.
 - d. Device shall consume no more than 6 W of power.
 - e. Device shall be capable of communicating with a group of at least 250 wireless mesh networked devices and luminaires, so as to reduce the amount of communication bridges required in the system.
 - f. Device shall be supplied with mounting hardware suitable for wall mounting in an office environment or utility closet.
 - g. Device shall have optional IP-rated enclosure suitable for wet location applications.
 - h. Device shall have optional heated enclosure suitable for below-freezing applications.
 - i. To provide security, the wireless bridge shall be unresponsive to wired and wireless communication that do not conform to the specific protocols used by the networked lighting control system.

PART 3 - EXECUTION

3.1 Installation Requirements

- A. Install systems in accordance with UL, NEC and all other applicable codes. Install system to comply with drawings and final shop drawings in compliance with manufacturer instructions. Provide all required hardware and labor for rack mounting

of head-end system components. This contractor shall be responsible for furnishing and installing all required cabling between components to form a complete and operational system meeting all the requirements of this specifications.

- B. Refer to plans for locations and quantities of equipment. Equipment locations shown on plans will be required to be field coordinated to ensure proper system operation.
- C. Where pathways do not exist for Lighting Control Low Voltage wiring, this contractor shall be responsible for providing all required raceways for control/communications cabling to meet building codes and manufacturer's recommendations.
- D. No items of equipment shall be installed in such a manner as to void or reduce the proper operating characteristics of individual components or of the system.
- E. Cables shall not be laid upon ceilings or supported in a manner that would violate any codes or standards. All control cables shall be installed in conduit.
- F. All cabling and accessories installed in ceiling spaces that are used for air distribution plenums shall be UL plenum rated.
- G. Provide firestop material and seal all cable penetrations in the building per 26 05 05 Firestopping.
- H. Perform all work under the on-site supervision of a factory authorized trained technician. It shall be the responsibility of the technician to check, inspect and adjust this installation to the Engineer's and Owner's approval. A CSR of the installing contractor or manufacturer shall train the Owner's personnel on the proper operation and maintenance of the equipment. Perform all work in conjunction with this installation in accordance with good engineering practices as established by NEC.
- I. Delivery of all loose equipment which is to be turned over to Owner shall be carefully coordinated and scheduled with Owner prior to shipment
- J. Installation Procedures and Verification
 - 1. The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
 - 2. The successful bidder shall install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the project submittals and plans specifications.
 - 3. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:
 - a. Wire Map (continuity, pin termination, shorts and open connections, etc.)
 - b. Length
 - c. Insertion Loss
- K. Coordination with Owner's IT Network Infrastructure

1. The contractor is required to coordinate with the owner's representative to secure all required network connections to the owner's IT network infrastructure.
 - a. The bidder shall provide to the owner's representative all network infrastructure requirements of the networked lighting control system.
 - b. The bidder shall provide to the manufacturer's representative all necessary contacts pertaining to the owner's IT infrastructure, to ensure that the system is properly connected and started up.

3.2 System Setup and Control Settings

- A. Contractor is responsible to program the system in this section according to the Owner's requirements. This includes the set up and assignment of zones, coordination of switches, etc. The Contractor shall meet with the Owner and/or Engineer and reach agreement on the programming. This programming agreement shall then be written out in detail and forwarded to the Engineer for approval. After approval is granted, proceed with final programming.
- B. All spaces indicated with manual switches or dimmers shall be controlled by those devices in their respective spaces along with occupancy sensors acting as vacancy sensors. Public spaces, restrooms, corridors, etc.... that do not have manual switches or dimmers indicated but do indicate occupancy sensors shall be controlled by a combination of time of day and occupancy sensors. Time of day settings and occupancy settings shall be coordinated with the University during the programming stages and shall be programmed per the owner's request.
- C. Manufacturer shall provide all scenes, and settings for all public spaces a requested by the owner to accommodate game days/nights, graduation, band competitions, performances, after hour use, job fairs, other sporting events, multipurpose venue events, etc..... Coordinate any and all instances and time settings for each with the owner and provide accordingly.
- D. Wireless software and controls shall be provided to the owner for control from a tablet or wireless device.
- E. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed by an authorized representative of the manufacturer.
 1. Low voltage network cable testing shall be performed by the contractor prior to system startup.
 2. System start-up and programming shall include:
 - a. Verifying operational communication to all system devices.
 - b. Programming the network devices into functional control zones to meet the required sequence of operation.
 - c. Programming and verifying all sequence of operations, time of day and schedules as required by the owner.
 - d. Customization of owner's software interfaces and applications.

3. Initial start-up and programming is to occur on-site. Additional programming (if required) may occur on-site or remotely over the Internet as necessary until the installation and final programming is complete.
- F. Provide 4 trips of programming for initial set up, this includes the set up and zoning, switches, etc for a complete and operational system. Provide 4 additional trips throughout the year for programming and trouble shooting for owner as requested by owner.
- G. Concourse corridor/public spaces shall be controlled thru time of day schedule, zoned by Quadrants. After hours the concourse shall be controlled by occupancy sensors, zoned by Quadrants. Provide all the programming and labor and material for a complete and operational system.

3.3 Identification/Labeling

- A. Contractor shall identify all major items of equipment and tag all cables with permanent type markers to denote equipment served. Cables shall be tagged at both ends and at each point where the cable is administered.

3.4 As-built Documentation/O&M Manuals

- A. Copies of all approved shop drawings with the Engineer's stamp.
- B. O&M manuals for every item of equipment when available from the manufacturer. These shall be the technical manuals provided by the manufacturer and shall not consist of generic sales brochures. Technical manuals shall provide complete specifications for the equipment as well as complete operating, maintenance, troubleshooting and product repair/replacement information.
- C. Lighting Control System drawings shall be updated with final As-Built information.
- D. System schematic and block diagrams for every system updated with final as-built information. These drawings shall define the exact arrangement of each system including wiring configuration, device locations and cable types.
- E. The installing contractor shall be responsible for documenting installed location of all networked devices, including networked luminaires. This includes responsibility to provide as-built plan drawing showing device address barcodes corresponding to locations of installed equipment.
- F. The installing contractor is also responsible for the following additional documentation to the manufacturer's representative if visualization / graphical floorplan software is provided as part of bid package:
 1. As-Built floor plan drawings showing daisy-chain wired network control zones outlined, in addition to device address locations required above. All documentation shall remain legible when reproducing\scanning drawing files for electronic submission.

2. As-Built electrical lighting drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans shall be based on as-built conditions.
 - a. CAD files shall have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:
 - a) Titleblock
 - b) Text- Inclusive of room names and numbers, fixture tags and drawings notes
 - c) Fixture wiring and homeruns
 - d) Control devices
 - e) Hatching or poché of light fixtures or architectural elements
 - b. CAD files shall be of AutoCAD 2013 or earlier. Autodesk Revit files overall floor plan views shall be exported to AutoCAD 2013.

3.5 Training Requirements

- A. Provide all training and utilize specified manuals and record documentation. Training shall be provided to all staff at the project site and coordinated with the Owner. Provide two (2) video copies of training.
- B. Training shall include multiple four-hour sessions encompassing all instructions required for system operation. Provide operators manuals and user guides with training. Provide follow up training after initial training. Provide a total of eight (8) hours of system training to the Owner.
- C. Training shall utilize the equipment provided at the project site. Coordinate use, time and availability of equipment with the Owner.
- D. Demonstrate adjustment, operation and maintenance of the system including each component and control.

3.6 Functional Testing

- A. Lighting control devices and control system shall be tested to ensure that control hardware, and software are calibrated, adjusted, programmed and in proper working condition in accordance with the manufacturer's installation instructions. A certificate of inspection shall be furnished by a qualified manufacturer's representative or equipment vendor; submit report to the Architect.

3.7 Project Turnover

- A. System Documentation
 1. Submit software database file with desired device labels and notes completed. Changes to this file will not be made by the factory.
 2. Owner Training

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP6 – February 21, 2020
Heapy – 2019-07018

- a. Provisions for onsite training for owner and designated attendees to be included in submittal package. A minimum of 8 hrs of training shall be provided to the owner or to the owner's satisfaction.

END OF SECTION

SECTION 26 52 00 EXIT AND EMERGENCY LIGHTING

PART 1 - GENERAL

- 1.1 Exit lighting and emergency lighting system wiring shall be run in conduit system which is completely independent of normal wiring systems.
- 1.2 Equipment to transfer power from a normal source to an emergency source are to be listed and labeled for load transfer.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

- 3.1 All circuits to have dedicated neutral conductor.
- 3.2 Test system operation for full 90 minutes witnessed by the AHJ.

END OF SECTION

SECTION 265600 EXTERIOR LIGHTING

PART 1 - GENERAL

- 1.1 Work includes a complete system of exterior lighting including luminaires, lamps, poles, bases, conduit, conductors, fusing, control devices, etc. as shown on drawings. Include all excavation, backfill, concrete bases and concrete encasement of underground conduits.
- 1.2 The catalog numbers listed on the schedule do not necessarily have complete prefix and suffix designations for placing the luminaire order. The Contractor shall verify these numbers and include in his bid the necessary plaster frames, accessories, trim, mounting hardware, etc. to achieve a coordinated installation with ceiling types indicated on the architectural drawings and in specifications. The Contractor shall provide any hardware indicated by notes on the fixture schedule.
- 1.3 Luminaires, drivers, ballasts and individual components shall bear UL label. All ballasts including compact fluorescents shall be high efficiency and high power factor (HPF).

PART 2 - PRODUCTS

- 2.1 Refer to data on the drawings for fixture details.
- 2.2 The pole manufacturer shall provide a factory installed internal impact type vibration damper in each pole where indicated on the drawings or when the pole is 25 ft. or greater in length.

PART 3 - EXECUTION

- 3.1 Concrete bases for standards shall be round formed above finish grade, chamfered corners and rubbed finish. Furnish anchor bolts as recommended by the manufacturer. Concrete bases shall be poured-in-place at the job site; steel reinforced concrete, minimum 3500 lb. test.
- 3.2 Provide a surge arrester behind the handhole in pole base of each lighting standard exceeding 15 ft. in height and connect to each phase conductor and 0.625 inches diameter by 10 ft. long copper clad driven ground rod providing a good grounding path. Connect the equipment grounding conductor to this grounding terminal. A separate ground rod is required for each lighting standard exceeding 15 ft. in height. Surge arresters shall be Square D Series SDSA, Joslyn Model Series 1250 or G.E. 9L15E and F Series. Install per NEC Article 280.
- 3.3 Provide Buss "KTK" fuses in HEB waterproof in-line holder ahead of the ballast in each "hot" leg; locate behind handhole in pole base.
- 3.4 Note these special installation procedures – never install a pole without the intended luminaire in place. Poles are designed to carry a load, and a pole cannot be installed before the luminaire is mounted because of the potential for damaging the pole from unwanted vibrations.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP6 – February 21, 2020
Heapy – 2019-07018

- 3.5 Mount standards truly vertical. Shim and grout under fixture base to level standards; visible shims will not be permitted. Provide anchor bolt covers.
- 3.6 Splicing shall be made with listed and approved, waterproof splicing kits and shall be located in base of poles behind handhole.
- 3.7 Install a green wire ground throughout the underground wiring system, and bond to all standards.

END OF SECTION

SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Optical-fiber-cable pathways and fittings.
3. Boxes, enclosures, and cabinets.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

1. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
2. Section 280528 "Pathways for Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.3 ACTION SUBMITTALS

- A. Product Data: For wireways and fittings, boxes, hinged-cover enclosures, and cabinets, submit under Section 260533 "Raceways and Boxes for Electrical Systems."
- B. Shop Drawings: For custom enclosures and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

- A. General Requirements for Metal Conduits and Fittings:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Comply with ANSI/TIA-569-C.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. EMT: Comply with ANSI C80.3 and UL 797.
- D. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Compression.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- C. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets:
 - 1. Comply with ANSI/TIA-569-C.
 - 2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA 3R.
- E. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- F. Gangable boxes are prohibited.
- G. Nonmetallic Outlet and Device Boxes: Are not permitted.
- H. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Are not permitted.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.

2.4 FIELD OR FACTORY PAINTING

- A. Raceways and junction boxes shall be factory finished or field painted in accordance with the manufactures instructions to match the existing conditions.
- B. Conduit mounted to white surfaces shall match Sonneborn Seal Coat Bright White #446-p (LRV-86) conduit mounted to bare concrete shall match Sherwin Williams Cinder Block Gray (SW1008).

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Outdoors: Apply pathway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - 2. Concealed Conduit, Aboveground: EMT.
 - 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.
- B. Indoors: Apply pathway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: GRC.
 - 3. Exposed and Subject to Severe Physical Damage: GRC.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.

5. Damp or Wet Locations: GRC.
 6. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
 7. Pathways for Optical-Fiber or Communications-Cable Risers in Vertical Shafts: EMT.
 8. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: EMT.
 9. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250 Type 4 stainless steel in wet locations.
- C. Minimum Pathway Size: 3/4-inch (21-mm) trade size. Minimum size for optical-fiber cables is 1 inch (27 mm).
- D. Pathway Fittings: Compatible with pathways and suitable for use and location.
1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
- E. Do not install aluminum conduits, boxes, or fittings.

3.2 INSTALLATION

- A. Comply with NECA 1, NECA 101, and ANSI/TIA-569-C for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.
- B. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches (300 mm) of changes in direction. Utilize long radius ells for all optical-fiber cables.
- F. Install conduits parallel or perpendicular to building lines to the greatest extent possible.
- G. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- H. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

- I. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- J. Install pull wires in all pathways.
- K. Pathways for Optical-Fiber and Communications Cable: Install pathways as follows:
 - 1. Install pathways in maximum lengths of 100 feet between pull points.
 - 2. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Three 90degree bends shall be permitted if:
 - a. The first bend is within 12 inches of the pull point.
 - b. The total conduit run is less than 33-feet.
 - c. Conduit is increased by one trade size.
- L. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
 - 1. Where otherwise required by NFPA 70.
- M. Expansion-Joint Assembly:
 - 1. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 - 3. Install expansion assembly indicated in electrical plans at all locations where conduits cross building or structure expansion joints.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage or deterioration.

END OF SECTION 270528

SECTION 270544 - SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.

- B. Grout. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

1. Section 260533 "Raceways and Boxes for Electrical Systems" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.
2. Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 SLEEVE-SEAL SYSTEMS

- A. Provide in accordance with Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

2.3 SLEEVE-SEAL FITTINGS

- A. Provide in accordance with Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

2.4 GROUT

- A. Provide in accordance with Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

- C. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
 - 1. Use circular metal sleeves.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- D. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for pathway. Position pathway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 270544

SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1.2 SUMMARY

A. Section Includes:

1. UTP cabling.
2. Fiber Optic Cabling
3. Cable connecting hardware, patch panels, and cross-connects.
4. Telecommunications outlet/connectors.
5. Cabling system identification products.
6. Cable management system.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.3 RELATED SECTIONS

1. Section 280513 "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with system panels and devices.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate layout and installation of telecommunications cabling with Owner's telecommunications and LAN equipment and service suppliers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Cabling administration drawings and printouts.
2. Wiring diagrams to show typical wiring schematics, including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.

3. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
4. No work will commence without approved Shop Drawings submittals.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.
- B. Source quality-control reports.
- C. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings, Cabling Administration Drawings, and field testing program development by a Registered Communications Distribution Designer (RCDD).
 2. Installation Supervision: Installation shall be under the direct supervision of a BICSI Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 3. Testing Supervisor: Currently certified by BICSI as a Registered Technician to supervise on-site testing independent of the installation supervisor.
 4. Field Inspector: Currently registered by BICSI as Registered Communications Distribution Designer (RCDD) to perform the on-site inspection.
- B. No work will commence without approved Quality Assurance submittals.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For splices and connectors to include in maintenance manuals.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.

PART 2 - PRODUCTS

2.1 HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the security enclosure. This cabling and its connecting hardware are called a "permanent link," a term that is used in the testing protocols.
 - 1. Horizontal cabling shall contain no transition points or consolidation points between the horizontal cross-connect and the telecommunications device.
 - 2. Bridged taps and splices shall not be installed in the horizontal cabling.
 - 3. Splitters shall not be installed as part of the optical fiber cabling.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in ANSI/TIA-568-C when tested according to test procedures of this standard.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Grounding: Comply with ANSI/TIA-607-B.

2.3 UTP CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Berk-Tek; a Nexans company.
 - 3. CommScope, Inc.
 - 4. Superior Essex Inc.
 - 5. Designer approved equivalent.
- B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.
 - 1. Comply with ICEA S-90-661 for mechanical properties.
 - 2. Comply with ANSI/TIA-568-C.1 for performance specifications.
 - 3. Comply with ANSI/TIA-568-C.2, Category 6.
 - 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - a. Communications, General Purpose: Type CM, CMP, or CMR.

- b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
- c. Communications, Riser Rated: Type CMR, CMP, complying with UL 1666.

2.4 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Hubbell Premise Wiring.
 - 3. Leviton Commercial Networks Division.
 - 4. Panduit Corp.
 - 5. Siemon Co. (The).
 - 6. Designer approved equivalent.
- B. General Requirements for Cable Connecting Hardware: Comply with ANSI/TIA-568-C, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.
- C. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.
- D. Patch Cords: Factory-made, four-pair cables in 72-inch (1200-mm) lengths; terminated with eight-position modular plug at each end.
 - 1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
 - 2. Patch cords shall have color-coded boots for circuit identification.

2.5 OPTICAL FIBER CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products from:
 - 1. Corning Cable Systems.
 - 2. Belden Inc.
 - 3. Berk-Tek; a Nexans company.
 - 4. CommScope, Inc.
 - 5. Superior Essex Inc.
 - 6. Designer approved equivalent.
- B. Description: Multimode, 50/125-micrometer, 2 fiber, nonconductive, tight buffer, OM3, optical fiber cable as indicated on the plans.
 - 1. Comply with ICEA S-83-596 for mechanical properties.
 - 2. Comply with ANSI/TIA-568-C for performance specifications.
 - 3. Comply with TIA-492AAAA-B for detailed specifications.

4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - a. Riser Rated, Nonconductive: Type OFNR or OFNP, complying with UL 1666.
5. Maximum Attenuation: 3.0 dB/km at 850 nm; 1.0 dB/km at 1300 nm.
6. Minimum Modal Bandwidth: 1500 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:

1. Jacket Color: Aqua for 50/125-micrometer cable.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-B.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.6 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products from:

1. Corning Cable Systems.
2. Belden Inc.
3. Berk-Tek; a Nexans company.
4. CommScope, Inc.
5. Superior Essex Inc.
6. Designer approved equivalent.

B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria of 25 percent.

C. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths. Connector type shall be LC.

D. Cable Connecting Hardware:

1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2, TIA-604-3-A, and TIA-604-12. Comply with ANSI/TIA-568-C.
2. Quick-connect Type LC connectors. Insertion loss not more than 0.5 dB.

2.7 GROUNDING

- A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
- B. Comply with ANSI/TIA-607-B.

2.8 IDENTIFICATION PRODUCTS

- A. Comply with ANSI/TIA-606-B and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Comply with requirements in Section 260553 "Identification for Electrical Systems."

2.9 SOURCE QUALITY CONTROL

- A. Factory test UTP and fiber optic cables on reels according to ANSI/TIA-568-C.
- B. Factory test UTP and fiber optic cables according to ANSI/TIA-568-C.
- C. Cable will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Install cables in pathways except within cabinets. Conceal pathways and cables except in unfinished spaces.
 - 1. Comply with requirements in Section 270528 "Pathways for Communications Systems."
- B. Wiring within Enclosures:
 - 1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
 - 2. Install lacing bars.
 - 3. Install conductors parallel with or at right angles to sides and back of enclosure.

3.2 INSTALLATION OF CABLES

- A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with ANSI/TIA-568-C.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. At the communications equipment enclosure, install a 10-foot- (3-m-) long service loop on each end of cable.
10. Pulling Cable: Monitor cable pull tensions; do not exceed the manufacturer's maximum tension.

C. UTP Cable Installation:

1. Comply with ANSI/TIA-568-C.
2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Fiber Optic Cable Installation:

1. Comply with ANSI/TIA-568-C.

E. Open-Cable Installation:

1. Open-cable installation is not permitted.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:

1. Comply with ANSI/TIA-569-C for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 6 inches (152 mm).

3.3 FIRESTOPPING

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
- B. Comply with ANSI/TIA-569-C.

3.4 GROUNDING

- A. Comply with ANSI/TIA-607-B.

- B. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
- C. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.5 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
 - 1. Administration Class: 3.
 - 2. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
- B. Paint and label colors for equipment identification shall comply with ANSI/TIA-606-B for Class 3 level of administration, including optional identification requirements of this standard].
- C. Cable Schedule: Post in prominent location in each equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- D. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications enclosures, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of ANSI/TIA-606-B. Furnish electronic record of all drawings, in software and format selected by Owner.
- E. Cable and Wire Identification:
 - 1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 - 2. Exposed: Label each cable at intervals not exceeding 15 feet (4.5 m).
 - 3. Label each terminal strip in each cabinet and panel.
 - a. Individually number wiring conductors, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
 - b. Label each unit and field within distribution racks and frames.

4. Identification within Connector Fields in Equipment Enclosures: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- F. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in ANSI/TIA-606-C. Hand written labels will not be accepted.
 1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.6 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections for UTP cabling:
 1. Visually inspect UTP cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with ANSI/TIA-568-C.
 2. Visually confirm Category 6, marking of outlets, cover plates, outlet/connectors, and patch panels.
 3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
5. UTP Performance Tests:
 - a. Test for each outlet. Perform the following tests according to ANSI/TIA-568-C.1 and ANSI/TIA-568-C.2:
 - 1) Wire map.
 - 2) Length (physical vs. electrical, and length requirements).
 - 3) Insertion loss.
 - 4) Near-end crosstalk (NEXT) loss.
 - 5) Power sum near-end crosstalk (PSNEXT) loss.
 - 6) Equal-level far-end crosstalk (ELFEXT).
 - 7) Power sum equal-level far-end crosstalk (PSELFEXT).

- 8) Return loss.
 - 9) Propagation delay.
 - 10) Delay skew.
- 6. Final Verification Tests: Perform verification tests for UTP systems after the complete communications cabling and workstation outlet/connectors are installed.
 - a. Voice Tests: Provide seven day advanced notice before testing all circuits. Receive written permission prior to testing 911 circuits. These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.
- B. Perform the following tests and inspections for fiber optic cabling:
 - 1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with ANSI/TIA-568-C.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Optical Fiber Cable Tests:
 - a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568-C. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:
 - 1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to ANSI/TIA-526-14-A, Method B, One Reference Jumper.
 - 2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in ANSI/TIA-568-C.
- C. Document data for each measurement. Data for submittals shall be transferred from the instrument to the computer, and printed and submitted.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare and submit test and inspection reports.

3.7 DEMONSTRATION

- A. Train Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets.

END OF SECTION 271500

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. UTP cabling.
2. 50/125-micrometer, multimode optical fiber cabling.
3. Coaxial cabling.
4. Low-voltage control cabling.
5. Control-circuit conductors.
6. Identification products.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Cabling administration drawings and printouts.
2. Wiring diagrams to show typical wiring schematics, including the following:
 - a. Cross-connects.
 - b. Patch panels.
 - c. Patch cords.
3. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
4. No work will commence without approved Shop Drawings submittals.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified layout technician, installation supervisor, and field inspector.

B. Source quality-control reports.

- C. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
 - 1. Layout Responsibility: Preparation of Shop Drawings and Cabling Administration Drawings, Cabling Administration Drawings, and field testing program development by a Registered Communications Distribution Designer (RCDD).
 - 2. Installation Supervision: Installation shall be under the direct supervision of a BICSI Registered Technician, who shall be present at all times when Work of this Section is performed at Project site.
 - 3. Testing Supervisor: Currently certified by BICSI as a Registered Technician to supervise on-site testing independent of the installation supervisor.
 - 4. Field Inspector: Currently registered by BICSI as Registered Communications Distribution Designer (RCDD) to perform the on-site inspection.
- B. No work will commence without approved Quality Assurance submittals.
- C. Testing Agency Qualifications: An NRTL.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 - 1. Test optical fiber cable on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; include the loss value of each. Retain test data and include the record in maintenance data.
 - 2. Test each pair of UTP cable for open and short circuits.

1.6 FIELD CONDITIONS

- A. Do not install conductors and cables that are wet, moisture damaged, or mold damaged.
 - 1. Indications that wire and cables are wet or moisture damaged include, but are not limited to, discoloration and sagging of factory packing materials.
- B. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry.

PART 2 - PRODUCTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 UTP CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Berk-Tek; a Nexans company.
 - 3. CommScope, Inc.
 - 4. Superior Essex Inc.
 - 5. Designer approved equivalent.
- B. Description: 100-ohm, four-pair UTP, covered with a blue thermoplastic jacket.
 - 1. Comply with ICEA S-90-661 for mechanical properties.
 - 2. Comply with ANSI/TIA-568-C.1 for performance specifications.
 - 3. Comply with ANSI/TIA-568-C.2, Category 6.
 - 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - a. Communications, General Purpose: Type CM.
 - b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
 - c. Communications, Riser Rated: Type CMR, complying with UL 1666.

2.3 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Belden Inc.
 - 2. Hubbell Incorporated; Hubbell Premise Wiring.
 - 3. Leviton Commercial Networks Division.
 - 4. Panduit Corp.
 - 5. Designer approved equivalent.
- B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.
- C. Connecting Blocks (existing): 110-style for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

2.4 OPTICAL FIBER CABLE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Corning Cable Systems.
 2. Belden Inc.
 3. Berk-Tek; a Nexans company.
 4. CommScope, Inc.
 5. Superior Essex Inc.
 6. Designer approved equivalent.
- B. Description: OM4 Multimode, 50/125-micrometer, 2-fiber, nonconductive, tight buffer, optical fiber cable.
1. Comply with ICEA S-83-596 for mechanical properties.
 2. Comply with ANSI/TIA-568-C.3 for performance specifications.
 3. Comply with TIA-492AAAA-A for detailed specifications.
 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
 - a. General Purpose, Nonconductive: Type OFN or OFNG.
 - b. Riser Rated, Nonconductive: Type OFNR, complying with UL 1666.
 5. Maximum Attenuation: 3.0 dB/km at 850 nm; 1.0 dB/km at 1300 nm.
 6. Minimum Modal Bandwidth: 500 MHz-km at 850 nm; 1500 MHz-km at 1300 nm.
- C. Jacket:
1. Jacket Color: Aqua for 50/125-micrometer cable.
 2. Cable cordage jacket, fiber, unit, and group color shall be according to ANSI/TIA-598-C.
 3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.5 OPTICAL FIBER CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Corning Cable Systems.
 2. Belden Inc.
 3. Berk-Tek; a Nexans company.
 4. CommScope, Inc.
 5. Superior Essex Inc.
 6. Designer approved equivalent.

- B. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA-604-2-B, TIA-604-3-B, and TIA-604-12. Comply with ANSI/TIA-568-C.3.

- 1. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.50 dB.
- 2. Type SFF connectors may be used in termination racks, panels, and equipment packages.

2.6 LOW-VOLTAGE CONTROL AND ALARM CABLE

- A. Paired Cable: NFPA 70, Type CMG.

- 1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors.
- 2. PVC insulation.
- 3. Unshielded.
- 4. PVC jacket.
- 5. Flame Resistance: Comply with UL 1581.

2.7 IDENTIFICATION PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Brady Worldwide, Inc.
 - 2. HellermannTyton North America.
 - 3. Panduit Corp.
- B. Comply with ANSI/TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- C. Comply with requirements in Section 260553 "Identification for Electrical Systems."

2.8 SOURCE QUALITY CONTROL

- A. Factory test coaxial, UTP, and optical fiber cables on reels according to ANSI/TIA-568-C.
- B. Factory test UTP cables according to ANSI/TIA-568-C.
- C. Factory test multimode optical fiber cables according to TIA-526-14-A and ANSI/TIA-568-C.
- D. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by

generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

- E. Cable will be considered defective if it does not pass tests and inspections.
- F. Prepare and submit test and inspection reports.

PART 3 - EXECUTION

3.1 INSTALLATION OF PATHWAYS

- A. Comply with requirements in Section 280528 "Pathway for Electronic Safety and Security" for installation of supports for cables.

3.2 WIRING METHOD

- A. Install wiring in metal pathways and wireways.
 - 1. Minimum conduit size shall be 3/4 inch (21 mm). Control and data transmission wiring shall not share conduit with other building wiring systems.
 - 2. Comply with requirements in Section 280528 "Pathways for Electronic Safety and Security."
 - 3. Comply with requirements in Section 270528 "Pathways for Communications Systems".
- B. Wiring within Enclosures:
 - 1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
 - 2. Install lacing bars and distribution spools.
 - 3. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer.
 - 4. Install conductors parallel with or at right angles to sides and back of enclosure.
 - 5. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks.
 - 6. Mark each terminal according to system's wiring diagrams.
 - 7. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. Conductors: Size according to system manufacturer's written instructions unless otherwise indicated.

C. General Requirements for Cabling:

1. Comply with ANSI/TIA-568-C.1.
2. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
3. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
4. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii.
5. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
6. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
7. Pulling Cable: Monitor cable pull tensions; do not exceed the manufacturer's maximum tension.

D. UTP Cable Installation: Install using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.

1. Comply with ANSI/TIA-568-C.
2. Install 110-style IDC termination hardware unless otherwise indicated.
3. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

E. Optical Fiber Cable Installation:

1. Comply with ANSI/TIA-568-C.
2. Cable shall be terminated on connecting hardware that is cabinet mounted.

F. Open-Cable Installation:

1. Open-cable installation is not permitted.

G. Separation from EMI Sources:

1. Comply with BICSI TDMM and ANSI/TIA-569-C recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).

- b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).
- 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
- 4. Separation between cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (75 mm).
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).
- 5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
- 6. Separation between Cables and Fluorescent Fixtures: A minimum of 6 inches (152 mm).

3.4 POWER AND CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

- 1. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.

3.5 CONNECTIONS

- A. Comply with requirements in Section 282300 "Video Surveillance" for connecting, terminating, and identifying wires and cables.

3.6 FIRESTOPPING

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."

- B. Comply with ANSI/TIA-569-C.

3.7 GROUNDING

- A. For communications wiring, comply with ANSI/J-STD-607-A.
- B. For low-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.8 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with ANSI/TIA-606-A.
- B. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.9 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with ANSI/TIA-568-C.
 - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - 3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test cables after termination but not cross connection.
 - a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568-C. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - 4. Optical Fiber Cable Tests:
 - a. Test instruments shall meet or exceed applicable requirements in ANSI/TIA-568-C. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
 - b. Link End-to-End Attenuation Tests:

- 1) Multimode Link Measurements: Test at 850 and 1300 nm in one direction according to ANSI/TIA-526-14-A, Method B, One Reference Jumper.
 - 2) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in ANSI/TIA-568-C.
- B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- C. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 280513

SECTION 280528 - PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Optical-fiber-cable pathways and fittings.
3. Boxes, enclosures, and cabinets.

1.2 RELATED SECTIONS

1. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
2. Section 270528 "Pathways for Communications Systems" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving communications systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets, submit under Section 260533 "Raceways and Boxes for Electrical Systems."
- B. Shop Drawings: For custom enclosures and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

A. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Comply with ANSI/TIA-569-C.

B. GRC: Comply with ANSI C80.1 and UL 6.

C. EMT: Comply with ANSI C80.3 and UL 797.

- D. FLMC: Comply with UL 360; zinc-coated steel.
- E. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
 - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
 - 2. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: Compression.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. ENT: Is not permitted.
- B. RNC: Is not permitted unless otherwise indicated. Comply with NEMA TC2 and UL 651.
- C. Continuous HDPE: Is not permitted.
- D. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- E. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 SURFACE PATHWAYS

- A. General Requirements for Surface Pathways:
- B. Surface Metal Pathways: Are not permitted.
- C. Surface Nonmetallic Pathways: Are not permitted.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets:
 - 1. Comply with ANSI/TIA-569-C.
 - 2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.

- B. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FD, with gasketed cover.
- D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- G. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep).
- H. Gangable boxes are prohibited.
- I. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Are not permitted.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- J. Cabinets:
 - 1. NEMA 250, Type 3R, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 FIELD OR FACTORY PAINTING

- A. Raceways and junction boxes shall be factory finished or field painted in accordance with the manufactures instructions to match the existing conditions.
- B. Conduit mounted to white surfaces shall match Sonneborn Seal Coat Bright White #446-p (LRV-86) conduit mounted to bare concrete shall match Sherwin Williams Cinder Block Gray (SW1008).

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

- A. Outdoors: Apply pathway products as specified below unless otherwise indicated:
 - 1. Exposed Conduit: GRC.
 - 2. Concealed Conduit, Aboveground: EMT.
 - 3. Underground Conduit: RNC, Type EPC-80-PVC, direct buried.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 4.
- B. Indoors: Apply pathway products as specified below unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Not Subject to Severe Physical Damage: GRC.
 - 3. Exposed and Subject to Severe Physical Damage: GRC.
 - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 5. Damp or Wet Locations: GRC.
 - 6. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
 - 7. Pathways for Optical-Fiber or Communications-Cable Risers in Vertical Shafts: EMT.
 - 8. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: EMT.
 - 9. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250, Type 4 stainless steel in wet locations.
- C. Minimum Pathway Size: 3/4-inch (21-mm) trade size. Minimum size for optical-fiber cables is 1 inch (27 mm).
- D. Pathway Fittings: Compatible with pathways and suitable for use and location.
 - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 - 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 - 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Do not install aluminum conduits or fittings.

3.2 INSTALLATION

- A. Comply with NECA 1, NECA 101, and ANSI/TIA-569-C for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

- B. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.
- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Install no more than the equivalent of two 90-degree bends are allowed. Support within 12 inches (300 mm) of changes in direction. Three 90-degree bend shall be permitted if:
 - a. The first bend is within 12 inches of the pull point.
 - b. The total conduit run is less than 33-feet.
 - c. Conduit is increased by one trade size.
- E. Install conduits parallel or perpendicular to building lines.
- F. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- G. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- H. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- I. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to conduit assembly to assure a continuous ground path.
- J. Install pull wires in all pathways.
- K. Pathways for Optical-Fiber and Communications Cable: Install pathways as follows:
 - 1. Install pathways in maximum lengths of 100 feet (30 m) between pull points.
 - 2. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements.
- L. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
 - 1. Where otherwise required by NFPA 70.
- M. Expansion-Joint Assembly:
 - 1. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.

- b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 - 3. Install expansion assembly indicated in electrical plans at all locations where conduits cross building or structure expansion joints.
- N. FLMC Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 280544 "Sleeves and Sleeve Seals for Electronic Safety and Security Pathways and Cabling."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
- 3.5 PROTECTION
- A. Protect coatings, finishes, and cabinets from damage and deterioration.

END OF SECTION 280528

SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Payment for all labor, materials, equipment, and consumables shall be included in the contract price as a lump sum for item special – central riverfront safety technologies, as per plans and specifications.
- B. Section Includes:
 - 1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
 - 2. Sleeve-seal systems.
 - 3. Sleeve-seal fittings.
 - 4. Grout.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- 1. Section 260533 "Raceway and Boxes for Electrical Systems" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.
- 2. Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

- A. Wall Sleeves:
 - 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.

- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - e. Proco Products, Inc.
 - 2. Sealing Elements: Rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Carbon steel.
 - 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

2.3 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
 - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
2. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
3. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
4. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Aboveground, Exterior-Wall Penetrations: Seal penetrations using [steel] [cast-iron] pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 280544

SECTION 282300 - VIDEO SURVEILLANCE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes video surveillance system equipment and accessories consisting of cameras, video transmission wiring, and coordination with control stations with its associated equipment.
- B. The requirements described herein shall be for the provision of all labor, materials, and expenses required for a complete and operational system. The Owner and End-user will collaborate, coordinate, and cooperate with the Integrator, but all installation resources are the responsibility of the Integrator.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
- B. Section 271500 "Communications Horizontal Cabling" for voice and data cabling associated with system field devices.
- C. Section 280513 "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with security devices.
- D. Section 280528 "Pathways and Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.
- E. Section 282400 "Emergency Telephone Equipment" for emergency telephone equipment consisting of emergency telephone modules, surface/wall mount enclosures, and accessories to be incorporated the emergency telephone systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.

- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
 - a. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - b. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
- C. Sequence of Operation: Narrative description of the view of preset positions, description of alarms, and description of unit output responses to an alarm for each alarmed device and CCTV camera.
- D. No work will proceed without approval of the action submittals.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and
- C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For cameras and equipment to include in emergency, operation, and maintenance manuals. In addition include the following:
 - 1) Lists of spare parts and replacement components recommended to be stored at the site for ready access.

1.6 QUALITY ASSURANCE

- A. The video surveillance system Integrator shall have been continuously engaged in the integration of the systems and components referenced in this specification for a minimum of 5 years. Submit documentation of required integration experience. Failure to provide adequate documentation for video surveillance systems integration of similar size and complexity will be considered as a disqualifying factor for the Security Integrator. Installation experience may not be substituted for integration experience.

- B. The video surveillance system Integrator shall have been continuously certified camera equipment installer for the proposed manufacturer for a minimum of 5 years. The video surveillance system Integrator shall be responsible for the total installation of all video surveillance system camera equipment and duly qualified to install, configure and maintain each video surveillance system component without support from any party than equipment manufacturer.
- C. The integrator's Project Manager shall have been continuously engaged in the management of IP and analog surveillance systems integration projects for a minimum of 5 years. Submit documentation of required Project Management experience for systems of the same type, size, and design as specified herein. Include the names, locations, and points of contact of at least five installations of the same type and design as specified herein. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 24 months. The Project Manager shall be authorized to act on behalf of the video surveillance system Integrator and have the authority to execute reasonable changes required during the integration process without additional approvals. The Project Manager shall attend, in person or via teleconference, all construction, coordination meeting, and periodic status meeting.
- D. Video Management Software: The video surveillance equipment described herein must be integrated into the Owner's existing Video Management Software (VMS) by the Owner or the Owner's Integrator of Record. No access will be granted to the Owner's Video Management Software to any party other than the Owner or the Owner's Integrator of Record. The video surveillance system Integrator for this contract will be required to coordinate the integration of security devices with the Owners IT staff to facilitate the integration of devices in to the Video Management System.
- E. Schedule: Submit an installation schedule for all installation and integration activities for approval. Schedule shall depict each activity, duration, proposed start and end dates, and the critical path for the project completion. The preferred format for the installations schedule is a Gantt chart.
- F. Test Procedures: Test procedures shall explain, in detail, step-by-step actions and expected results demonstrating compliance with the requirements of the specification. Test reports shall be used to document results of ALL tests including field verification testing, performance testing, endurance testing, and acceptance testing. Reports shall be delivered to the Construction Manager within 3 days after completion of each test. Do not proceed to the next stage of testing without written approval of the owner or owner's representative.
- G. No work will proceed without approval of the quality assurance submittals. Delays in providing the quality assurance submittals will not relieve the Integrator of the responsibility to maintain the project progress as agreed and documented, by the Integrator, in the project schedule.

- H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- I. Comply with NECA 1.
- J. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 - 1. Control Station: Existing Video Management Software and video monitoring stations.
 - 2. Interior, Controlled Environment: System components, except central-station control unit, installed in interior environments shall be rated for continuous operation in ambient temperatures of 32 to 122 deg F (0 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
 - 3. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of minus 30 to 122 deg F (minus 18 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.
 - 4. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h). Use NEMA 250, Type 3R enclosures.
 - 5. Hazardous Environment: System components located in areas where fire or explosion hazards may exist because of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers shall be rated, listed, and installed according to NFPA 70.
 - 6. Security Environment: Camera housing for use in high-risk areas where surveillance equipment may be subject to physical violence.

1.8 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 - a. Warranty Period: One years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

- A. Video-signal format shall comply with NTSC standard, composite interlaced video. IP video shall be Ethernet as indicated on the plans.
- B. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through communication, signal, or control. Include surge protection for external wiring of each conductor's entry connection to components.
- C. Color Cameras:
 - a. Quality Assurance:
 - 1) Prior to installation, submit data of the installers' experience and certified qualifications as describe in paragraph 1.8.
 - 2) Obtain written approval of installer from the Engineer through the Construction Manager.
 - 3) Upon approval of installer's qualifications schedule a pre-planning meeting with the Owner, Construction Manager, and end-users.
 - 4) Approved installers shall be present to perform or supervise the installation activities.
 - 5) Submit test procedures and cut-over plan for the approval of the Owner.

2.2 STANDARD PAN/TILT/ZOOM CAMERAS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Axis Communications M5525-E PTZ Network Camera or comparable product by one of the following:
 - a. Axis Communications.
 - b. Bosch Security Systems, Inc.
 - c. Honeywell International Inc.; Honeywell Video Systems.
 - d. Panasonic Corporation of North America; Panasonic Security Systems.
 - e. Designer Approved Equivalent.

2.3 STANDARD FIXED CAMERAS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- B. Basis-of-Design Product: Subject to compliance with requirements, provide Axis Communications P3225-VE Mk II Network Camera or comparable product by one of the following:
 - a. Axis Communications.
 - b. Bosch Security Systems, Inc.
 - c. Honeywell International Inc.; Honeywell Video Systems.
 - d. Panasonic Corporation of North America; Panasonic Security Systems.
 - e. Designer Approved Equivalent.

2.4 FIXED ELEVATOR CAMERA

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Axis Communications P9106 Network Camera or comparable product by one of the following:
 - a. Axis Communications.
 - b. Bosch Security Systems, Inc.
 - c. Honeywell International Inc.; Honeywell Video Systems.
 - d. Panasonic Corporation of North America; Panasonic Security Systems.
 - e. Designer Approved Equivalent.

2.5 MEDIA CONVERTERS CABINET AND POE INJECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Axis Communications T98A15-VE Media Converter Cabinet A fitted with two (2) Axis T8120 Midspan PoE Injector and Axis Cabinet Lock A or comparable product by one of the following:
 - a. Axis Communications.
 - b. Bosch Security Systems, Inc.
 - c. Honeywell International Inc.; Honeywell Video Systems.
 - d. Panasonic Corporation of North America; Panasonic Security Systems.
 - e. Designer Approved Equivalent.
- C. Media converters shall be fitted with Axis Communications T8612 SFP Module LC.SX as required to provide a complete transmission link.

2.6 CAMERA-SUPPORTING EQUIPMENT

- A. Manufacturers: Subject to compliance with requirements, provide products suitable for the proposed PTZ and Fixed Cameras by one of the following:
 - a. Pelco
 - b. Axis Communications.
 - c. Bosch Security Systems, Inc.
 - d. Honeywell International Inc.; Honeywell Video Systems.
 - e. Panasonic Corporation of North America; Panasonic Security Systems.
 - f. Designer Approved Equivalent.
- B. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.
- C. Mounting Brackets for PTZ Cameras: Type matched to items supported and corner or wall mounting to match each camera's conditions.
- D. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions.

2.7 RACK MOUNTED MEDIA CONVERTER

- A. Manufacturers: Subject to compliance with requirements, provide Comnet Communications Networks media converters.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide Comnet Communications Networks C2-US Rack Mount Card Cage Fitted with Comnet CNGE22MC media converters or comparable product by one of the following:
 - 1. Designer Approved Equivalent.
- C. Media converters shall be fitted with Comnet CNGE2MC SFP-16 Module as required to provide a complete transmission link.
- D. Provide blank filler (C1-BP) panels for all unused positions in the C2-US chassis.

2.8 CONTROL STATIONS

- A. Manufacturers: Existing.

2.9 GENETEC DEVICE LICENSES

- 2.10 The Security Integrator shall obtain, under this contract, Genetec Video Management System device licenses for each new camera provided under this contract. These licenses are required to integrate each new camera in to the existing VMS. Device

licenses shall be turned over to the City of Cincinnati Police IT Section through the Construction Manager and Owner.

2.11 SIGNAL TRANSMISSION COMPONENTS

A. Digital:

1. Cable: OM3 multimode fiber optic and Category 6 UTP cable. Comply with requirements in Section 280513 "Conductors and Cables for Electronic Safety and Security."
2. UTP Cable Connectors: 8 position/8 conductor Category 6 jack. Comply with requirements in Section 280513 "Conductors and Cables for Electronic Safety and Security."
3. Fiber Optic Cable Connectors: LC Type fiber optic connector. Comply with requirements in Section 280513 "Conductors and Cables for Electronic Safety and Security."

PART 3 - EXECUTION

3.1 COORDINATION

- A. Coordinate layout and installation of communications equipment with Owner's telecommunications staff, networking staff, and service suppliers.
1. It is the Integrator's responsibility to schedule and document the video surveillance system equipment coordination meeting prior to the installation of new equipment or devices.
 2. Video surveillance system equipment cut-over/commissioning shall be coordinated with the Owner through the Construction Manager. No cut-over/commissioning work will be permitted without advanced coordination. Request coordination meetings a minimum of 10 days in advance.
 3. Record agreements reached in meetings and distribute them to other participants.
 4. Adjust arrangements and locations of equipment to optimize the equipments effectiveness.
 5. Adjust arrangements and locations of equipment to coordinate wwith the existing conditions and existing equipment.
- B. Coordinate location of power raceways and receptacles with locations of video surveillance system equipment requiring electrical power to operate.

3.2 EXAMINATION

- A. Make arrangement with the Owner through the Construction Manager to examine the existing conditions and system equipment.
- B. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 WIRING

- A. Wiring Method: Install cables in raceways unless otherwise indicated.
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- C. Splices, Taps, and Terminations: For power and control wiring, use labeled terminal strips in terminal cabinets and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- D. For LAN connection and copper communication wiring, comply with Section 271300 "Communications Backbone Cabling" and Section 271500 "Communications Horizontal Cabling."
- E. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.4 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras level and plumb.
- B. Install cameras with 102-inch (2592-mm) minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.
- C. Identify system components, wiring, cabling, and terminals according to Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
2. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
3. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

C. Video surveillance system will be considered defective if it does not pass tests and inspections.

D. Prepare and submit test and inspection reports.

3.6 OPERATIONAL TESTS

A. General: Provide all personnel, equipment, instrumentation, and supplies necessary to perform all site testing. The Owner's representative will witness all performance verification testing. Original copies of all test data produced during performance verification and endurance testing shall be turned over to the Construction Manager and Engineer at the conclusion of each phase of testing prior to Owner's approval of the test.

B. Operational testing specified in this section shall be coordinated with operational testing specified in Section 24 00 00 Emergency Telephone Equipment (paragraph 3.7).

C. Integrator's Field Testing (pre-testing): Verify transmission media operation, calibrate and test all equipment, place the system components in service, and notify the Owner or Owner's integrator that system/components are ready for integration in to the Owner's VMS. Deliver a report describing results of functional tests, diagnostics, and calibrations including written certification to the Owner that the installed components have been calibrated, tested, and are ready for integration in to the VMS and for performance verification testing. The report shall also include a copy of the approved performance verification test procedure. The field testing shall, as a minimum, include:

1. Verification that the video transmission system and any signal or control cabling have been installed, tested, and approved as specified.
2. Verification that the remote devices are functional, communicate with the security network, and perform all functions as specified.
3. Verification that media converters and PoE injectors are functioning correctly.
4. Verification that all video sources and video outputs provide a full bandwidth signal at all video inputs.
5. Verification that all cameras are aimed and focused properly. Conduct a walk test of the area covered by each camera to verify the field of view.

6. Verification that alarm interfaces are functional all designated alarm points and cameras.
 7. Verification of all controls for pan, tilt and zoom mechanisms are operative and that the controls perform the desired function.
- D. Performance Verification Test: Demonstrate that the completed video surveillance system equipment complies with the contract requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated and shown. The performance verification test, as specified, shall not be started until approval of the pre-testing submittal has been received. This shall include certification of successful completion of Integrator Field Testing as specified in paragraph "Integrator's Field Testing" (paragraph 3.6A). The Owner, Construction Manager, Engineer, and City of Cincinnati Police Information Technology Section may terminate testing at any time when the system fails to perform. Upon termination of testing by the Owner, Construction Manager, Engineer, or City of Cincinnati Police Information Technology Section or by the Integrator, commence an assessment period as described for as specified in paragraph "Assessment" (paragraph 3.6D). Upon successful completion of the performance verification test, deliver test reports to the Construction Manager.
- E. Assessment: After the conclusion of Performance Verification Test, identify all failures, determine cause of all failures, repair all failures, and deliver a written report to the Construction Manager. The report shall explain the nature of each failure, corrective action taken, results of tests performed, and shall recommend retesting to be performed by the Owner or Owner's integrator. After delivering the written report, convene a test review meeting to present the results and recommendations to the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Integrator's report and the test review meeting, the Construction Manager will determine the retest date, or may require that Performance Verification Test be repeated in its entirety. If the retest is completed without any failures, the Integrator may proceed directly to Phase III testing after receipt of written permission from the Owner.
- F. Endurance Testing: The test shall be conducted 24 hours per day for 7 consecutive calendar days, including holidays, and the system shall be operated by the Owner as specified. Make no repairs during this phase of testing unless authorized by the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section in writing. At the conclusion of the Endurance Test period commence an assessment period as specified in paragraph "Assessment" (paragraph 3.6D). If at the conclusion of the Endurance Test period no failures of the new equipment have occurred proceed to "Cleaning" (paragraph 3.7) and "CLOSEOUT SUBMITTALS" (paragraph 1.5).
- 3.7 CLEANING
- A. Clean installed items using methods and materials recommended in writing by manufacturer.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
BP6 – February 21, 2020
THP #98090.38

- B. Clean installed video surveillance system components, including camera-housing windows, lenses, and screens.

END OF SECTION 282300

SECTION 282400 – EMERGENCY TELEPHONE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes emergency telephone equipment consisting of emergency telephone modules, surface/wall mount enclosures to be incorporated the emergency telephone systems.
- B. Public emergency telephone locations require new cabling and raceways as depicted in the drawings. These telephones shall be connected to POTS lines provided by the Owner through existing backbone cabling and existing entrance facilities.
- C. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
- B. Section 271500 "Communications Horizontal Cabling" for voice and data cabling associated with system field devices.
- C. Section 280513 "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with security devices.
- D. Section 280528 "Pathways and Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For emergency telephone equipment. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

2. Work will not proceed without approved shop drawings.

- C. Equipment List: Include every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For telephone equipment to include in emergency, operation, and maintenance manuals. In addition include the following:
1. Lists of spare parts and replacement components recommended being stored at the site for ready access.

1.6 QUALITY ASSURANCE

- A. System installation contractor shall have been consistently engage in the installation of the systems and components referenced in this specification for a minimum of 2 years. Submit documentation of required experience.
- B. Installer's Qualifications: Prior to installation, submit data of the installer's experience and certified qualifications. Show that the installer who will perform the work has a minimum of 2 years experience successfully installing systems of a similar type and design as specified herein. Include the names, locations, and points of contact of at least three installations of the same type and design as specified herein where the installer has installed such systems. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.
- C. Test Procedures: Test procedures shall be submitted in advance and explain, in detail, step-by-step actions and expected results demonstrating compliance with the requirements of the specification. Test reports shall be used to document results of the tests. Reports shall be delivered to the Owner's representative within 7 days after completion of each test.
- D. No work will proceed without approval of the quality assurance submittals.

- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Comply with NECA 1.
- G. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 - 1. Control Station: Existing.
 - 2. Interior, Controlled Environment: System components, except central-station control unit, installed in interior environments shall be rated for continuous operation in ambient temperatures of 32 to 122 deg F (0 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
 - 3. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of minus 30 to 122 deg F (minus 18 to plus 50 deg C)] dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.
 - 4. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 30 to plus 122 deg F (minus 34 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph (137 km/h). Use NEMA 250, Type 3R enclosures.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: One years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

- A. Emergency telephone equipment must be compatible with POTS lines.
- B. Cable: Category 6 Unshielded Twisted Pair. Comply with requirements in Section 271500 "COMMUNICATIONS HORIZONTAL CABLING "
- C. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through communication, signal, or control. Include surge protection for external wiring of each conductor's entry connection to components.
- D. Tamper Protection: Ensure phone module and enclosures are manufacture and assembled to be vandal resistant.
- E. Emergency Telephone Modules:
 - 1. Unit shall comply with Part 68 of the FCC rules for the United States.
 - 2. Unit shall be capable of operating on standard phone lines or analog PBX extensions.
 - 3. Shall be line powered without external power source.
 - 4. Unit shall utilize tone dialing.
 - 5. Unit shall be capable of silent monitoring.
 - 6. Unit shall be programmable with two different telephone numbers of up to 18 digits each including pauses. If first number does not answer or is busy, unit shall automatically call the second number. If that number is busy or does not answer, unit shall call the first number again. Unit shall continue alternating until call is answered or call timer limit is reached.
 - 7. All programming shall be stored in non-volatile EEPROM memory.
 - 8. Unit shall include two auxiliary outputs and one auxiliary input that are isolated from the telephone line.
 - 9. Outputs shall be activated, providing a dry contact closure automatically when Emergency Phone is activated.
 - 10. Input shall allow unit to be activated by any device or switch that provides a contact closure.
 - 11. Unit shall be capable of automatically notifying attendant of location via programmable voice ID.
 - 12. When call is finished, unit shall automatically shut off.
 - 13. Shall auto-answer to allow secure monitoring.
 - 14. Include raised letter and Braille signage for ADA compliance
 - 15. Vandal resistant steel faceplate.
 - 16. Call connect LED indicator for hearing impaired.
- F. Wall Mount Emergency Telephone Enclosure.
 - 1. Shall be ADA-compliant.
 - 2. Vandal-resistant steel construction.
 - 3. Shall included a Blue LED Light mounted inside a polycarbonate housing.

4. Blue LED Light shall be continuously lit.
5. Blue LED Light shall flash for duration of a call when telephone module “EMERGENCY” button is pressed.
6. Shall be marked “EMERGENCY” with 2 in. high reflective red lettering.
7. Signal-to-Noise Ratio: Not less than 50 dB, with camera AGC off.
8. Must be designed and manufactured to accept the Emergency Telephone Modules without field modification.

2.2 STANDARD EMERGENCY TELEPHONE MODULES

- A. Manufacturers: Talk-A-Phone
- B. Subject to compliance with requirements, provide Talk-A-Phone; ETP-400.

2.3 STANDARD WALL MOUNT ENCLOSURE

- A. Manufacturers: Talk-A-Phone
- B. Subject to compliance with requirements, provide Talk-A-Phone model ETP-WM/E.

PART 3 - EXECUTION

3.1 EXISTING EQUIPMENT

- A. Existing telecommunication service entrance equipment is located in the City of Cincinnati Police Welcome Center. Backbone cabling has been extended to the existing Telecommunications Enclosure in the Upper Level of Lot 24 indicated on the plans.
- B. Extend Category 3 UTP from the enclosure to each new Emergency telephone location.

3.2 COORDINATION

- A. Coordinate layout and installation of communications equipment with Owner's telecommunications staff, networking staff, and service suppliers (as required).
 1. It is the contractor's responsibility to schedule and document the telecommunications coordination meeting prior to the installation of new equipment or devices.
 2. Meet jointly with telecommunications and LAN staff, local exchange carrier representatives, and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.
 3. Automated Location Information for E911 shall be provided by the City of Cincinnati Police Department IT Section.

4. Record agreements reached in meetings and distribute them to other participants.

- B. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

3.3 EXAMINATION

- A. Make arrangement with the Owner's representative to examine the existing system equipment.
- B. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to telephone equipment installation, and other conditions affecting installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 WIRING

- A. Comply with requirements in 270528 "Pathways for Communications Systems".
- B. Wiring Method: Install cables in raceways unless otherwise indicated on the plans.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.
- D. Splices, Taps, and Terminations: For power and control wiring, use labeled terminal strips in terminal cabinets and equipment enclosures.
- E. For telephone copper communication wiring, comply with Section 271500 "Communications Horizontal Cabling."

3.5 EMERGENCY TELEPHONE EQUIPMENT INSTALLATION

- A. Install telephone enclosures level and plumb.
- B. Install emergency telephones with the center of the call button at 48-inches above finished floor (A.F.F.).
- C. Connect all controls and alarms, and adjust. Install pan-and-tilt camera to obtain the field of view required to capture each emergency telephone unit.
- D. Identify system components, wiring, cabling, and terminals according to Section 260553 "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Prepare emergency telephone equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list described in "Informational Submittals" Article.
 - b. Verify operation of auto dialer.
 - 3. All testing of emergency telephones configured for dialing 911 shall be coordinated with the City of Cincinnati Emergency Communications Center.
 - 4. Test Schedule: Refer to Section 282300 - Video Surveillance Equipment.
 - 5. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- C. Emergency telephone equipment will be considered defective if it does not pass tests and inspections.
- D. Prepare and submit test and inspection reports.

3.7 OPERATIONAL TESTS

- A. General: Provide all personnel, equipment, instrumentation, and supplies necessary to perform all site testing. The Owner's representative will witness all performance verification and endurance testing. Written permission shall be obtained from the owner before proceeding with the next phase of testing. Original copies of all test data produced during performance verification and endurance testing shall be turned over to the owner at the conclusion of each phase of testing prior to owner approval of the test.
- B. Operational testing specified in this section shall be coordinated with operational testing specified in Section 23 00 00 Video Surveillance Equipment (paragraph 3.6).
- C. Contractor's Field Testing (pre-testing): Calibrate and test all equipment, verify transmission media operation, place the integrated system in service, and test the integrated system. Deliver a report describing results of functional tests, diagnostics, and calibrations including written certification to the Owner that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification

test procedure. Submit a letter certifying that the Emergency Telephone and CCTV system is ready for performance verification testing. The field testing shall, as a minimum, include:

1. Verification that the communications cabling and any signal or control cabling have been installed, tested, and approved as specified.
 2. Verification that all cameras are aimed and focused properly.
 3. Verification that alarm interfaces are functional and that automatic camera call-up is functional with appropriate video annotation for all designated emergency telephones and cameras.
- D. Performance Verification Test: Demonstrate that the completed Emergency Telephone and CCTV systems comply with the contract requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated and shown. The performance verification test, as specified, shall not be started until receipt by the Contractor of written permission from the Owner, based on the Contractor's written report. This shall include certification of successful completion of Contractor Field Testing as specified in paragraph "Contractor's Field Testing" (paragraph 3.7B). The Owner, Construction Manager, Engineer, and City of Cincinnati Police Information Technology Section may terminate testing at any time when the system fails to perform. Upon termination of testing by the Owner, Construction Manager, Engineer, or City of Cincinnati Police Information Technology Section or by the Integrator, commence an assessment period as described for as specified in paragraph "Assessment" (paragraph 3.7E). Upon successful completion of the performance verification test, deliver test reports to the Construction Manager.
- E. Assessment: After the conclusion of Performance Verification Test, identify all failures, determine cause of all failures, repair all failures, and deliver a written report to the Construction Manager. The report shall explain the nature of each failure, corrective action taken, results of tests performed, and shall recommend retesting to be performed by the Owner or Owner's integrator. After delivering the written report, convene a test review meeting to present the results and recommendations to the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Integrator's report and the test review meeting, the Construction Manager will determine the retest date, or may require that Performance Verification Test be repeated in its entirety. If the retest is completed without any failures, the Integrator may proceed directly to "Endurance Testing" (Paragraph 3.6F) testing after receipt of written permission from the Owner.
- F. Endurance Testing: The test shall be conducted 24 hours per day for 7 consecutive calendar days, including holidays, and the system shall be operated by the Owner as specified. Make no repairs during this phase of testing unless authorized by the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section in writing. At the conclusion of the Endurance Test period commence an assessment period as specified in paragraph "Assessment" (paragraph 3.6D). If at the conclusion of the Endurance Test period no failures of the new equipment have

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Streetgrid
BP6 – February 21, 2020
THP #98090.38

occurred proceed to “Cleaning” (paragraph 3.8) and “CLOSEOUT SUBMITTALS” (paragraph 1.5).

3.8 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.

END OF SECTION 282400

SECTION 282450 – ALARM ANNUNCIATION AND REMOTE NOTIFICATION EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes emergency telephone and duress annunciation and notification equipment to support the emergency telephone and duress alarm systems consisting of duress buttons, cabling, local and remote alarm annunciation panels, remote notification auto-dialers.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 RELATED SECTIONS

- A. Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.
- B. Section 280513 "Conductors and Cables for Electronic Safety and Security" for voice and data cabling associated with security devices.
- C. Section 280528 "Pathways and Electronic Safety and Security" for conduits, surface pathways, innerduct, boxes, and faceplate adapters serving electronic safety and security.
- D. Section 282400 "Emergency Telephone Equipment" for emergency telephone equipment consisting of emergency telephone modules, surface/wall mount enclosures, and accessories to be incorporated the emergency telephone systems.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Schematics and wiring diagrams shall indicate the detailed interconnection of emergency telephone, duress alarm, annunciation panels, and auto dialers.
 - 2. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Dimensioned plan and elevations of equipment enclosures, interfaces and antenna. Show access and workspace requirements.
- B. Field Survey Shop Drawings: Include on-site survey conducted by a manufacturer certified layout technician. Shop Drawings shall include inspection of existing infrastructure, identification for annunciation panel locations, confirmation of power plans, verification of system capacities, and mounting details. Portions of the survey shop drawings submittal may be submitted in narrative format.
- C. Equipment List: Include every piece of equipment by model number, manufacturer, location, and date of original installation. Add pretesting record of each piece of equipment, listing the name of the organization conducted the testing, and date of test.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For annunciation and notification equipment to include in emergency, operation, and maintenance manuals. In addition include the following:
 1. Lists of spare parts and replacement components recommended to be stored for ready access.

1.6 QUALITY ASSURANCE

- A. The system Integrator shall have been continuously engaged in the integration of the systems and components referenced in this specification for a minimum of 2 years. Submit documentation of required integration experience. Failure to provide adequate documentation for the systems integration of similar size and complexity will be considered as a disqualifying factor for the system integrator. Installation experience may not be substituted for integration experience.
- B. Installer's Qualifications: Prior to installation, submit data of the installer's experience and certified qualifications. Show that the installer who will perform the work has a minimum of 2 years experience successfully installing systems of the same type and design as specified herein. Include the names, locations, and points of contact of at least three installations of the same type and design as specified herein where the installer has installed such systems. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.

- C. Test Procedures: Test procedures shall explain, in detail, step-by-step actions and expected results demonstrating compliance with the requirements of the specification. Test reports shall be used to document results of the tests. Reports shall be delivered to the Owner's representative within 3 days after completion of each test.
- D. No work will proceed without approval of the quality assurance submittals.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- F. Comply with NECA 1.
- G. Comply with NFPA 70.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Equipment shall be capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 - 1. Interior, Controlled Environment: System components, except central-station control unit, installed in interior environments shall be rated for continuous operation in ambient temperatures of 32 to 122 deg F (0 to 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
 - 2. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of minus 30 to 122 deg F (minus 18 to plus 50 deg C) dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 3R enclosures.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to equipment that fails in material or workmanship within specified warranty period.
 - 1. Warranty Period: One years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

The new emergency telephones and duress buttons provided by this contract shall be added to the existing emergency alarm annunciation and notification system. When an emergency telephone or duress location is activated the existing emergency alarm annunciation and notification system illuminates a visual alarm on the local rack mounted annunciator, illuminates a visual alarm on the master annunciator, and initiates telephone contact with the Owner, Owner's representative, or end-users as deemed necessary by the Owner.

New emergency telephones and duress buttons and associated alarm cabling shall be provided installed, integrated with the existing emergency annunciation and notification system and tested.

- A. Cable: Comply with requirements in Section 280513 "Conductors and Cables for Electronic Safety and Security."

2.2 ALARM ANNUNCIATION MODULES

- A. Existing.

2.3 RACK MOUNT ANNUNCIATOR PANEL

- A. Existing.

2.4 WALL MOUNT ANNUNCIATOR PANEL

- A. Existing.

2.5 COMMUNICATIONS MODULE

- A. Existing.

2.6 RS485 SERIAL TO ETHERNET COMMUNICATIONS CONVERTER

- A. Manufacturer: B & B Electronics
- B. Basis of Design:

Subject to compliance with requirements, provide Vlinx Serial Server, model ESP901 or approved comparable product by one of the following manufacturers:

Approved equal

2.7 HOLD UP (DURESS) BUTTON

- A. Manufacturer: United Security Products
- B. Basis of Design:

Subject to compliance with requirements, provide United Security Products, model HUB3B Hold Up Button or approved comparable product by one of the following manufacturers:

Approved equal

2.8 GROUNDING

- A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
- B. Comply with J-STD-607-A.

2.9 LABELING

- A. Comply with ANSI/TIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.

3.2 COORDINATION

- A. Coordinate layout and installation of equipment with owner or owner's representative and service suppliers (as required).
 - 1. It is the contractor's responsibility to schedule and document the coordination meetings prior to the installation of new equipment or devices.
 - 2. Meet jointly with the Construction and Owner representatives to exchange information and agree on details of equipment arrangements and installation interfaces.
 - 3. Record agreements reached in meetings and distribute them to other participants.
 - 4. Adjust arrangements and locations of equipment to accommodate and optimize equipment performance.

- B. Coordinate location of power raceways with locations of equipment requiring electrical power to operate.

3.3 EXAMINATION

- A. Make arrangement with the owner's representative to examine the existing system equipment.
- B. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to telephone equipment installation, and other conditions affecting installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 WIRING

- A. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems and Section 280513 "Conductors and Cables for Electronic Safety and Security" .
- B. Wiring Method: Install cables in raceways unless otherwise indicated on the plans.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to termination points without exceeding manufacturer's limitations on bending radii.
- D. Splices, Taps, and Terminations: Comply with NFPA 70 and the manufacturers requirements.

3.5 EQUIPMENT INSTALLATION

- A. Install enclosures level and plumb.
- B. Connect all power, network and controls and adjust.
- C. Identify system components, wiring, cabling, and terminals according to Section 260553 "Identification for Electrical Systems."

3.6 GROUNDING

- A. Bond metallic equipment using a grounding conductor, insulated, green in color.

3.7 IDENTIFICATION

- A. System components shall be labeled with the device tag provided in the device schedules provided in the plans.

- B. Comply with requirements in Section 260553 "Identification for Electrical Systems."
- C. Labels shall be preprinted or computer-printed type. Hand written labels will not be accepted.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Inspect components, assemblies, and equipment installations, including connections, prior to testing.
- B. Tests and Inspections:
 - 1. Inspection: Verify that units, cables, and connectors are properly installed, connected, and labeled, and that interconnecting wires are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with system requirements. Prepare equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list described in "Informational Submittals" Article.
 - b. Verify operation of local annunciator panels.
 - 3. All testing shall be coordinated with the Owner through the Construction Manager.
 - 4. Test Schedule: Refer to Section 282300 - Video Surveillance Equipment.
 - 5. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- C. Notification and annunciation equipment will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.9 OPERATIONAL TESTS

- A. General: Provide all personnel, equipment, instrumentation, and supplies necessary to perform all site testing. The Owner's representative will witness all performance verification and endurance testing. Written permission shall be obtained from the owner before proceeding with the next phase of testing. Original copies of all test data produced during performance verification and endurance testing shall be turned over to the owner at the conclusion of each phase of testing prior to owner approval of the test.
- B. Operational testing specified in this section shall be coordinated with operational testing specified in Section 23 00 00 Video Surveillance Equipment (paragraph 3.6).

- C. Contractor's Field Testing (Pre-testing): Calibrate and test all equipment, verify transmission media operation, place the integrated system in service, and test the integrated system. Deliver a report describing results of functional tests, diagnostics, and calibrations including written certification to the Owner that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure. Submit a letter certifying that the wireless network system is ready for performance verification testing. The field testing shall, as a minimum, include:
1. Verification that any signal or control cabling have been installed, tested, and approved as specified.
 2. Verification that all equipment is properly installed and configured.
- D. Performance Verification Test: Demonstrate that the completed system complies with the contract requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated. The performance verification test, as specified, shall not be started until receipt by the Contractor of written permission from the Owner, based on the Contractor's written report. This shall include certification of successful completion of Contractor Field Testing as specified in paragraph "Contractor's Field Testing" (paragraph 3.9C). The Owner may terminate testing at any time when the system fails to perform as specified. Upon termination of testing by the Owner or by the Contractor, commence an assessment period as described in paragraph "Assessment" (paragraph 3.9E). Upon successful completion of the performance verification test, deliver test reports and other documentation, as specified, to the Owner prior to commencing the endurance test.
- E. Assessment: After the conclusion of Performance Verification Test, identify all failures, determine cause of all failures, repair all failures, and deliver a written report to the Construction Manager. The report shall explain the nature of each failure, corrective action taken, results of tests performed, and shall recommend retesting to be performed by the Owner or Owner's integrator. After delivering the written report, convene a test review meeting to present the results and recommendations to the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Integrator's report and the test review meeting, the Construction Manager will determine the retest date, or may require that Performance Verification Test be repeated in its entirety. If the retest is completed without any failures, the Integrator may proceed directly to "Endurance Testing" (Paragraph 3.6F) testing after receipt of written permission from the Owner.
- F. Endurance Testing: The test shall be conducted 24 hours per day for 7 consecutive calendar days, including holidays, and the system shall be operated by the Owner as specified. Make no repairs during this phase of testing unless authorized by the Owner, Construction Manager, and City of Cincinnati Police Information Technology Section in writing. At the conclusion of the Endurance Test period commence an assessment period as specified in paragraph "Assessment" (paragraph 3.6D). If at the conclusion of the Endurance Test period no failures of the new equipment have

occurred proceed to “Cleaning” (paragraph 3.10) and “CLOSEOUT SUBMITTALS” (paragraph 1.5).

3.10 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.

END OF SECTION 272450

SECTION 321440
GRANITE UNIT PAVING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Granite pavers on sand/cement setting bed.

1.2 RELATED SECTIONS

- A. Section 033000 - Cast-in-Place Concrete
- B. Section 044213 - Exterior Stone Cladding.
- C. Section 044302 - Granite
- D. Section 057000 - Ornamental Metals
- E. Section 071400 - Fluid Applied Waterproofing
- A. Section 079200 - Sealants

1.3 REFERENCES

- A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
 - 1. American Society for Testing and Materials (ASTM):
 - C 97 Absorption and Bulk Specific Gravity of Natural Building Stone
 - C 150 Portland Cement
 - C 170 Compressive Strength of Dimension Stone
 - C 615 Structural Granite
 - C 615 Granite Dimension Stone
 - C 880 Flexural Strength of Natural Building Stone

1.4 SUBMITTALS

- A. Samples: Samples of granite pavers shall be “range samples” provided from the quarry granite pavers will be supplied from. Submit the following samples:

<u>Item</u>	<u>Quantity and Size</u>
Granite Paver	Two required each size, full size and full thickness, specified color and finish.
Granite Curb	One 4 ft. long section required, full height x full width, specified color and finish.

- B. Manufacturer's Product Data:
 - 1. Sand-Cement setting bed materials, including additives.
 - 2. Polymeric sand joint filler
- C. Shop Drawings: Indicate sizes, dimensions, layout, and finishes, and relationship to adjacent items.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information.
- E. Contractor's Review: Before commencing work, submit written statement signed by the Contractor stating that the Contract Documents have been reviewed with a qualified representative of granite supplier, and that the selected materials and construction are proper, compatible, and adequate for the application shown.

1.5 TESTS, INSPECTIONS AND VERIFICATIONS

- A. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:
 - 1. Compressive strength, psi. (ASTM C 170)
 - 2. Density, lbs./c.f. (ASTM C 97)
 - 3. Absorption by weight, % (ASTM C 97)
 - 4. Abrasion resistance (ASTM C 241)
 - 5. Flexural strength psi. (MPa) (ASTM C 880)
- B. Resistance to freezing and thawing shall be determined in accordance with Section 8 of ASTM C 67 for five pavers. The pavers shall have no breakage and no more than 1.0 percent loss of any individual unit in dry weight when subjected to 50 cycles of freezing and thawing.
- C. Dimensional Tolerance:
 - 1. The length and width of each paver in the sample shall not vary from any other paver in this or any other lot sample by more than 1/8 inch.
 - 2. Thickness of any paver in the sample shall not vary by more than 1/8 inch from the specified paver thickness.
- E. Retest: The Contractor shall notify the Architect if any pavers fail to meet the specified requirements. In case the shipment fails to conform to the specified requirements, the Contractor may sort it, and new specimens shall be selected by the Contractor from the retained lot for retesting, as directed by the Architect. All granite paver retests shall be performed at the expense of the Contractor. In case the second set of specimens fail to conform to the test requirements, the entire lot shall be rejected.

1.6 SAMPLE PANEL

- A. Construct a sample panel of granite paving on specified setting bed and base before start of any granite paving. Sample panel shall exhibit granite pavers, grain and grain direction, and

required jointing and relationship to adjacent paving. Minimum size of panel shall be 10 ft. x 10 ft. Sample panel shall be reviewed by the Architect and Owner. If the original sample is not acceptable, construct additional panels at no cost to the Owner until an acceptable panel is constructed. The acceptable panel shall become the standard for the entire job, and shall remain undisturbed until completion of all granite paving.

1. Build sample panel in location as directed by Architect.
2. Notify Architect seven days in advance of dates and times when sample panel will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's and Owner's approval of sample panel before starting unit paver installation.
5. Maintain sample panel during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove sample panel when directed.

1.7 QUALITY ASSURANCE

- A. Granite shall conform to the requirements of ASTM C 615, Architectural Grade and NBGQA Specifications, except as modified herein.
- B. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
 1. Granites shall be quarried by members of the National Building Granite Quarries Association, Inc. and shall meet the specified test criteria.

1.8 DELIVERY, HANDLING, AND STORAGE

- A. Granite shall be packed and banded by the supplier for shipment. Store on wood skids or pallets, covered with non-staining, waterproof membrane and protected from weather. Place skids to evenly distribute the weight of the granite materials, and to prevent damage to granite. Store granite to allow air to circulate around the granite material. Do not place granite in direct contact with the ground.

1.9 PROTECTION OF FINISHED SURFACES

- A. Finished surfaces adjacent to the paving work shall be adequately protected from soling, staining, and other damage.

1.10 JOB CONDITIONS

- A. Cold Weather Protection:

1. Remove any ice or snow formed on granite or concrete bed by carefully applying heat until top surface is dry to touch.
2. Remove granite work determined to be damaged by freezing conditions.

- B. Cold Weather Protection for Completed Granite Work:

<u>Mean Daily Air Temperature</u>	<u>Procedures</u>
40° – 32°F.	Protect granite work from rain or snow for at least 24 hours by covering with weather-resistive membrane.
32° – 25°F.	Completely cover granite work with weather-resistive membrane for at least 24 hours.
25° – 20°F.	Completely cover granite work with insulating blankets or similar protection for at least 24 hours.
20° – below	Maintain granite work at temperature above 32°F. for 24 hours using enclosures and supplemental heat.

1. Do not use frozen materials or materials mixed or coated with ice or frost.
2. Do not build on frozen work.
3. During all seasons, protect partially completed granite work against weather when work is not in progress.

PART 2 PRODUCTS

2.1 PAVERS - GENERAL

- A. Granite shall be standard grade, free of cracks, seam, starts, or other defects which may impair its strength, durability or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discoloration, or other defects which would affect its appearance. Color, texture and finish shall be within the range of samples approved by the Architect.

- B. Granite shall conform to ASTM C 615 and be of the sizes and dimensions indicated on the Drawings.
- C. Granite pavers shall conform to the following requirements:
 - 1. Absorption by weight shall not exceed 4%.
 - 2. Compressive strength of not less than 19,000 psi.
 - 3. Minimum density of 160 pcf.

2.2 GRANITE PAVERS

- A. FIELD COLOR: Smithfield, RI 02917.
 - 1. Color shall be "Deer Isle".
 - 2. Size shall be 1 ft. x 2 ft. x 3 in. and 2 in. thick as indicated on the Drawings.
 - 3. Finish: Thermal.
- B. ACCENT COLOR:
 - 1. Color: "Prairie Brown".
 - 2. Size: 1 ft. x 2 ft. x 3 in. and 2 in. thick as indicated on the Drawings, cut to dimensions and radii required by the fabricator prior to shipment to the project site.
 - 3. Finish: Diamond 10.

2.3 GEOTEXTILE FABRIC

- A. Non-woven polypropylene fabric made specifically for use in subsurface drainage structures.
- B. Mirafi 140N, manufactured by Tencate, 365 South Holland Drive, Pendergrass, GA 30567, or approved equal

2.4 EDGE RESTRAINT

- A. Edge Restraint System shall be EdgePro Max Paver Restraint System, heavy duty PVC edge restraint with 2.75 in. vertical wall height, manufactured by Dimex LLC, Marietta, OH, 45750, or approved equal.

2.5 SAND-CEMENT SETTING BED

- A. Setting bed shall be a Portland cement and sand mixture.
- B. Mixture shall be one part Portland cement and three parts sand.
 - 1. Portland cement shall conform to ASTM C 150, Type I or II.
 - 2. Sand shall be clean, sharp, natural sand conforming to ASTM C 33, except that the fineness modulus shall be 2.25 ± 0.10 .
 - a. Gradation for setting bed sand shall be as follows:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
3/8 in.	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 50	10-30
No. 100	5-15
No. 200	0-10

2.6 POLYMERIC SAND FOR JOINT FILLER

- A. Joint filler shall be Alliance Gator Maxx polymeric sand, manufactured by Alliance Designer Products Inc., or approved equal.
 - 1. Color as selected by Architect.

PART 3 EXECUTION

3.1 ACCEPTABILITY OF EXISTING CONDITIONS

- A. Contractor shall examine the concrete subbase, waterproofing, drainage board, protective board, and other work that may impact the installation of the granite paver work. Evidence of inadequate conditions shall be brought to the immediate attention of the Construction Manager.
- B. Start of work of this Section shall constitute acceptance of existing conditions.

3.2 INSTALLATION, GENERAL

- A. Do not use granite pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in the finished work.
- B. Mixed pavers from several pallets or cubes, as they are placed, to produce blend of colors and textures.
- C. Cut granite paves with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.
- D. Joint Pattern: As indicated on the Drawings.
- E. Unfilled Gaps: Any gaps between granite pavers and any structures, or other members that cannot be filled with a whole paver shall be filled with a granite paver cut to fit the gap, except that slivers will not be allowed and the minimum size of cut block shall be 1/3 full dimension. Cutting shall be done with a hydraulic splitter, a masonry saw, or other device that leaves a clean, vertical face without spalling. Gaps between the paver and adjoining structure greater than 1/4 inch will not be accepted.

- F. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3mm in 3 m) from level, or indicated slope, for finished surface of paving.

- 3.3 Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler as backing for sealant-filled joints where indicated. Install joint filler before setting pavers. Refer to spec Section 079200 – Sealants.

3.4 CUTTING AND FITTING

- A. Full units of the proper size shall be used wherever possible. Cutting and fitting, including that required to accommodate the work of others, shall be done by using power masonry saws. Stone units may be wet or dry cut. Wet cut lines, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp.

3.5 EDGE RESTRAINT

- A. PVC edge restraint system shall be installed in strict accordance with manufacturer's printed instructions.

3.6 SETTING ON SAND-CEMENT BED

- A. Sand-cement shall be mixed dry until the mass is of uniform color. Once thoroughly mixed, the mass shall be lightly moistened with water.
- B. Sand-cement mixture shall be spread over concrete base as a setting bed for pavers. Mixture shall be spread, and leveled to required slope and grade. Minimum thickness of setting bed shall be 1 in. after leveling. The bedding shall be left uncompacted and shall not be disturbed by any pedestrian or vehicle construction traffic.
- C. Surface tolerance shall be with 1/4 in. of required grade as measured with a 10 ft. straightedge in both transverse and longitudinal directions.
- D. The area of bedding placed in any one work day shall be scheduled so that no bedding course remains at the end of the day with a paver course.
- E. Place granite pavers in the indicated pattern. Placement of paver shall start from a corner or straight edge and proceed forward over the undisturbed bedding layer. The joints shall be 1/4 in. width.
- F. Spread dry polymeric sand and fill joints immediately after setting pavers. Minimum depth: 1.25".
 - 1. Make sure that the pavers' side and top surfaces are dry before applying the polymeric sand. Spread joint filler sand over the pavers then use a hard-bristle brush to sweep the sand into the joints, filling them completely. Run a vibrating plate over the pavers in several directions to compact the sand inside the joints (this action is not appropriate for slabs). Repeat this step (spreading the sand, then compacting) at least two more times. If a vibrating plate compactor cannot be used, tamp the stones with a rubber mallet and make sure the sand is densely packed in the joints.
 - 2. Using a fine-bristle broom, remove any excess from paver surfaces. Make sure the finished sad is level is at least 1/8 in. lower than the surface of the paver. Using a leaf

blower, remove any sand residue from paved surfaces. Depending on the physical layout, it may be more appropriate to remove residue by using a vacuum unit.

3. At a height of 4 feet (1.2m), use a water gun connected to a hose to direct a fine mist (water gun setting: "mist" or equivalent) of water on a specific paver area for 10 to 15 seconds. Wait 3 to 4 minutes (not longer).
4. From a height of 2 feet (.60m), aim the water mist again directly at the paved surface. Mist and rinse simultaneously so as to eliminate any sand residue left on the pavers. Any sand residue should go directly into the paver joints. Wait 3 to 4 minutes (not longer).
5. From a height of 2 feet (.60m) aim the water mist again directly at the paved surface. Again, mist and rinse simultaneously so as to eliminate any joint filler sand residue left on the pavers. The sand residue should go directly into the paver joints. However, stop misting when you see a minimal amount of water retention on the paver joints. **NOTE:** Repeat the directions of steps 3 to 5 for all other areas that have not been misted with water.
6. Use a leaf blower to remove any excess water lying on paver pores and crevices. This blowing action is necessary to help remove any remaining joint filler sand residue that was left on the paver surface from the previous steps.

3.7 ADJUST AND CLEAN

- A. Remove and replace granite pieces which are broken, chipped, stained, or otherwise damaged. Remove and replace units which are misaligned or not to grade or do not match adjoining granite work. Provide new matching units, install as specified and point-up joints, or refill with sand to eliminate evidence of replacement. Repair defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- B. Clean granite work with less than six days after completion of work, using a clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents, or other cleaning compounds with caustic or harsh fillers.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 321813

SYNTHETIC TURF SURFACE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Furnish all labor, materials, tools and equipment necessary to install, in place, all synthetic turf as indicated on the plans and as specified herein, including all related materials not specified under another section but required for the work, whether or not specifically referred to herein. The installation of all new materials shall be performed in strict accordance with the manufacturer's written installation instruction, and in accordance with all approved shop drawings.
- B. Related Sections:
 - 1. Division 31 Section "Earth Moving"
 - 2. Division 32 Section "Concrete Paving"
 - 3. Division 33 Section "Storm Drainage"

1.3 DEFINITIONS

- A. Contractor: Entity awarded contract to construct the synthetic turf surface; acting prime contractor.
- B. Installer: Entity to physically construct said portion of the synthetic turf surface.
- C. Manufacturer: Entity to make material to be sold to the contractor and/or installer.

1.4 PERFORMANCE REQUIREMENTS

- A. Synthetic turf system shall be capable of conducting runoff from a storm of 60 minutes duration (having a rate of rainfall for a 5-minute peak intensity of approximately 6" per hour and a total of 2.0" of rain in an hour) vertically and horizontally through the turf, base, and underdrains to the outfall pipe without ponding above the top of the infill. Ponding above the top of the infill shall be defined as standing water that is discernible

by the naked eye covering an area of the surface greater than 3 square yards for a sustained period of 10 minutes or longer.

1.5 SUBMITTALS

A. Submit the following with proposal on BID Day.

1. Sample of Finish Stone and sieve analysis. (Review by engineer does not relieve contractor of responsibility to ensure that the synthetic turf system meets the specified drainage requirements). See Part 2 – Products.
2. The base contractor (if different from the turf contractor employees) must provide a list of at least five (5) synthetic turf bases completed within the last 3 years, including an owner representative and telephone number.
3. Synthetic Turf – One sample, approximately 12" X 12" filled; and one rag sample (unfilled).
4. Specification sheet of the fiber and carpet system provided in the sample.
5. A statement naming the manufacturer of the grass-like fibers.
6. Yarn manufacturer specification sheet of the specified fiber to be used within the system, per the products section of this specification.
7. Sand / Rubber mix with proper mix ratio – One sample.
8. List of at least ten (10) existing installations, including Owner representative and telephone number, whom can attest to compliance with quality assurance information. Five (5) of the existing installations must be within 150 miles of the project site.
9. Quality assurance information as delineated in paragraphs 1.6A, 1.6B (if applicable), 1.6C, 1.6D, and 1.6E below.
10. A sample of the warranty noting any exceptions to the warranty information listed in the warranty section of this specification.
11. If there are items within these specifications that the submitting party cannot comply with, these must be identified in a substitution request submitted to the architect no less than 96 hours prior to bids being due. The architect will then determine if such deviation is approved or denied. Deviations to these specifications may at the discretion of the owner be grounds for dismissal of the contractors bid proposal.

B. Prior to order of materials, the Contractor shall submit the following:

1. Signed Certification Letter from the contractor stating that the stone base products to be installed match what was submitted as part of item 1.5.A.1.
2. Signed Certification Letter from the contractor stating that the synthetic turf products to be installed match what was submitted as part of item 1.5.A.3, 1.5.A.4, 1.5.A.5 and 1.5.A.6.
3. Signed Certification of Compliance confirming infill has been tested in agreement with the STC Guideline "Suggested Environmental Guidelines for Infill" dated August 25, 2015 (in accordance with European Standard EN 71-3).
4. Shop Drawings
 - a. Shop drawings shall be prepared at the scale of the construction documents and contain all pertinent information regarding installation.

These drawings shall be submitted to the Owner for approval prior to the manufacturing and shipment of materials.

- b. Submit drawings for:
 - I. Seaming plan.
 - II. Installation details; edge details, methods of attachment, back stop detail, other inserts, method of cutting around backstop and others inserts, etc.
 - III. Other details on construction, especially any details that may deviate from these plans and specifications. Deviations to these plans and specifications may at the discretion owner be grounds for dismissal of the contractors bid proposal.
- 5. Turf 'rag" samples illustrating range in color selections with details of product matching the specifications described in Part 2 - Products.
- C. Prior to the beginning of installation, the contractor (installer) of the synthetic turf shall inspect the subbase and supply a signed letter of Subbase Acceptance for the purpose of obtaining contractor's warranty for the finished synthetic playing surface and base drainage system.
- D. Prior to Final Acceptance, the Contractor shall submit the following:
 - 1. Three (3) copies of Maintenance Manuals, which will include all necessary instructions for the proper care and preventative maintenance of the synthetic turf system.
 - a. Provide descriptions of all equipment recommended for maintenance and repair, including both equipment provided by the Contractor, and by the owner.
 - 2. Certified test data indicating the finished surface meets the required shock attenuation, as per ASTM F355 (method) and ASTM F1936 (procedure). If the surface tests less than the acceptable limit (softer), the contractor can re-test after 90 days of use and weathering, prior to beginning modifications to the infill content.
 - 3. For the carpet installed, submit certified copies of independent (third-party) laboratory reports on the following ASTM tests:
 - a. Pile Height, Face Weight & Total Fabric Weight – ASTM D418
 - b. Primary & Secondary Backing Weights – ASTM D418
 - c. Tuft Bind – ASTM D1335
 - d. Grab Tear Strength – ASTM D1682
 - 4. For the sand/rubber infill installed, submit delivery tickets for each super sack with the following information:
 - a. Manufacturer's name and address
 - b. Time and date for when infill was manufactured

- c. Total weight of each super sack

1.6 QUALITY ASSURANCE

A. Synthetic Turf Contractor (Installer)'s Experience:

1. The synthetic turf installer shall have the experience of at least Twenty (20) acceptable installations in the United States within the past three (3) years of tufted, slit film polyethylene grass-like fabric.
2. The contractor (installer) shall employ only qualified, experienced supervisors and technicians skilled in the installation of this specific type of synthetic grass system.
3. The contractor (installer) shall have been continuously in business, under the same name, for at least the past five (5) years.
4. The contractor (installer) shall have been in the construction and/or synthetic turf installation business, under the same ownership, for at least five (5) years.
5. The contractor (installer) must be a member of the Synthetic Turf Council.
6. The contractor (installer) must be experienced in installations of synthetic grass products from the same manufacturer and product specified and proposed for this project.

B. Sub-Base and Gravel Base Contractor (Installer)'s Experience (if different than Synthetic Turf Contractor):

1. The sub-base and gravel base installer shall have the experience of at least Five (5) acceptable installations within the past three (3) years of sub-base and base gravel specifically for synthetic turf applications.
2. The base contractor (installer) shall employ only qualified, experienced supervisors and technicians skilled in the installation of this specific type of drainage system for synthetic turf applications.
3. The base contractor (installer) shall have been continuously in business, under the same name, for at least the past five (5) years.
4. The base contractor (installer) shall have been in the synthetic turf construction and/or synthetic turf installation business, under the same ownership, for at least five (5) years.

C. All contractors must meet the following criteria:

1. Have proper Contractor's license, in good standing, and have never had a license revoked.
2. Have not had a Surety or Bonding company finish work on any contract within the last ten (10) years.
3. Have not been disqualified or barred from performing work for any public Owner or other contracting entity.
4. No current litigation for unacceptable work or non-completion of work.

D. Warranty: The Contractor shall submit its Single Source Warranty that guarantees the usability and playability of the full synthetic turf system for its intended uses for an eight (8) year period commencing with the date of Substantial Completion, against all

defects in workmanship of the subgrade, drainage, gravel foundation, yarn fibers, and turf surface. The warranty coverage shall not be limited to the amount of the usage.

1. The warranty submitted must have the following characteristics:
 - a. Must provide full coverage for eight (8) years from the date of Substantial Completion.
 - b. Must warrant materials and workmanship, including but not limited to gravel base stability, drainage rates, seaming materials and adhesives.
 - c. Must warrant that the finished and accepted surface elevation shall not vary by more than 0.1' due to instability of the gravel foundation (unrelated to existing, pre-developed subgrade soil conditions) or drainage system and that the drainage rates will remain at or above design capacity for the life of the warranty.
 - d. Must have a provision to either make a cash refund or repair or replace such portions of the installed materials that are no longer serviceable to maintain a serviceable and playable surface.
 - e. Must be a warranty from a single source covering workmanship and all self-manufactured or procured materials of the turf, turf system, base, aggregate base, and drainage.
 - f. Warrant that the yarn used to make the grass-like tufts will maintain its UV stability and tensile strength such that the strength of the fiber when measured in accordance with ASTM D-2256 will not decrease by more than 50% during the warranty period due to breakdown of UV stability.

E. Manufacturer Qualifications

1. Must specialize in manufacturing (tufting) the products and fibers specified in this section.
2. Must be experienced in the manufacture of this specific type of infilled synthetic grass system. This includes the tuft fiber, backing(s), and backing coating.
3. Shall have manufactured (tufted) more than fifteen million (15,000,000) square feet of polyethylene tufted turf for landscape use in the past five (5) years.
4. The manufacturer must be a member of the Synthetic Turf Council (STC).

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver products to the site in wrapped, unopened condition.
- B. Store products in safe, clean location and in a manner to protect from accidental damage

1.8 EXISTING CONDITIONS

- A. The contractor shall review and accept existing conditions prior to bidding. The contractor shall again review and accept existing conditions prior to beginning the installation.

- B. The contractor shall protect all existing conditions that are not part of the scope of work and repair any damage to existing conditions that occurs during this scope of work.

1.9 LAYOUT

- A. See drawings for layout. Contractor shall survey, verify all measurements and submit full layout as a dimensioned drawing with all proposed graphics included, for owner review/approval, notifying of any conflicts.

1.10 TEMPORARY UTILITIES

- A. Contractor may connect to the Owner's existing utilities, as available, to supply necessary water, adequate lighting and electricity for installation.
- B. Contractor shall supply temporary sanitation facilities, including paying all costs associated therewith.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Pre-approved Infilled Synthetic Turf supplier / installers:

1. The Motz Group (Basis of Design)
3607 Church Street, Suite 300
Cincinnati, Ohio 45244
Phone (513) 533-6452

2.2 MATERIALS

- A. All components and their installation method shall be designed and manufactured for use on outdoor landscape applications. The materials as hereinafter specified, should be able to withstand full climatic exposure in location of installation, be resistant to insect infestation, rot, fungus and mildew; to ultra-violet light and heat degradation.
- B. The finished playing surface shall appear as mowed grass with no irregularities or wrinkles and shall afford excellent traction for conventional athletic shoes of all types. The finished surface shall resist abrasion and cutting from normal use. The system shall be ideal for baseball, football, soccer, intramurals and recreational use.
- C. Synthetic Turf: Alternate – Monofilament
 1. Tufted, monofilament polyethylene grass-like material, coated with a urethane secondary backing. The fibers shall be tufted to a finished pile height of not less than 2.125". Tufting gauge shall be no greater than 0.75".
 2. All Monofilament Fibers must be Shaw Sports Turf Powerblade Pro (or approved equal)
 3. Pile Yarn (Polypropylene (LSR) yarn with resistance to fibrillation is prohibited): Proven athletic caliber yarn designed specifically for outdoor use and stabilized to

resist the effect of ultraviolet degradation, heat, foot traffic, water and airborne pollutants. The pile fiber, shall possess the following physical characteristics:

- | | | |
|----|----------------------|------------------|
| a. | Yarn Denier | 10,800 (nominal) |
| b. | Yarn Dimension | 300 micron |
| c. | Breaking Load: | Min. 30 psi |
| d. | Elongation to Break: | >9% |
| e. | Moisture Regain | <0.5% |

4. The finished carpet shall possess the following physical characteristics:

- | | | |
|----|---|---|
| a. | Finished Pile Height | >1.50"
<2.00" |
| b. | Pile Yarn Weight (Total) | ≥ 80 oz./sq. yd. |
| c. | Primary Backing (Triple Primary) | 8.5 oz./sy |
| | <i>I. Two woven polypropylene, one non-woven</i> | |
| d. | Secondary Urethane Coating | ≥ 26 oz./sq. yd. |
| e. | Fabric Width | 15' |
| f. | Tuft Bind Strength | >8 lbs. (without infill) |
| g. | Tuft Bind Strength | >10 lbs. (with infill) |
| h. | Grab Tear Strength (Machine Direction) | >190 lbs. |
| i. | Grab Tear Strength (Cross Machine Direction) | >250 lbs. |
| j. | Pill "Burn" Test | Pass (with infill) |
| k. | Machine Gauge | ≤ 3/4" |
| l. | Backing Perforations | 3/8" dia., 3"x4" centers. |
| m. | Exposed Fiber above infill | ≥ 1/2", ≤ 3/4" |
| n. | Lisport Testing | > 40,000 cycles
(negligible splitting) |
| o. | Impact Attenuation | |
| | <i>I. >90 and <130 G-max value for 30 days following installation</i> | |
| | <i>II. <165 through life of warranty.</i> | |

D. Synthetic Turf: Alternate - PE or Nylon thatch layer

1. 12 oz./sq. yd. (minimum)

E. Infill System: Acrylic Coated Sand

1. In fill material shall be 100% acrylic coated sand (US Greentech Envirofill, or approved equal). No Rubber. Infill system shall have a minimum weight of 4 pounds per square foot, +/- 0.5 pounds. Infill shall possess these physical characteristics:

- | | | |
|----|----------------------------|--------------------------------|
| a. | Coefficient of Uniformity: | ≤ 1.3 |
| b. | Particle Size: | ≥ 98% retained on sieves 12-20 |
| c. | Angle of Repose: | ≤ 30° |
| d. | Color: | Green |

F. Elastic Layer Shock / Underlayment Pad

1. The shock attenuation pad shall be a minimum 23mm pre-formed pad, manufactured in interlocking panels (ProPlay Sport 23) with gaps for thermal expansion.

G. Perimeter edge details, underground storm sewer piping and connections, required for the system shall be as detailed on the drawings with modifications as recommended by the manufacturer, only after approval by the Architect. The cost for these modifications shall be included in the Contract Sum.

H. Provide the following maintenance equipment:

1. Grooming Brush – 72" wide for tractor attachment
2. Sweeper – 46" wide for tractor attachment

I. The entire synthetic infill turf system shall be resistant to attack by bacteria and to fungal growth.

J. The entire synthetic turf system shall be "lead-free".

K. Finish Gravel is to be angular clean washed No. 9 gravel, free of dust and fines and according to the following:

% Passing	Material	
	#57, washed	#9m, washed
1"	95 to 100	100
3/4"		100
1/2"	25 to 60	100
3/8"		75 to 100
#4	0 to 10	0 to 25
#8	0 to 5	0 to 5
#16	---	---
#30	---	---
#50	---	---
#100	---	---
#200	---	---

PART 3 - EXECUTION

3.1 GENERAL

- A. The installation shall be performed in full compliance with approved shop drawings.

- B. Only trained technicians skilled in the installation of athletic caliber synthetic turf systems, working under the direct supervision of certified turf builder's supervisors, shall undertake the placement of the system.
- C. The surface to receive the synthetic turf shall be inspected and certified by the installer as ready for the installation of the synthetic turf system and must be perfectly clean as installation commences and shall be maintained in that condition throughout the process.

3.2 SITE WORK

- A. Fine-grade subgrade to elevations required to create final finish turf infill elevation flush with proposed curb surface. Surface to be on uniform plane and grade.
- B. Subgrade: Laser grade the subgrade to a tolerance of + 0.5" of design elevation. Proof-roll the subgrade to assure a consistent and uniform compaction of a least 92% across the entire surface. Owner is to be provided with 24 hour notice of proof-roll. Proof-roll to occur in the presence of owner or owner's representative. The Owner, or owner's representative will observe the subgrade and inform the contractor of visual acceptance of the subgrade conditions. Acceptance of the subgrade is required before the contractor can commence drainage installation and/or gravel base placement. The Owner reserves the right to inspect and test the subgrade as it deems appropriate, including employing a certified surveyor or geotechnical engineer. Such acceptance, however, does not relieve the Bidder of responsibility for complying with these specifications.
- C. Drainage: Install drainage according to the plans and specifications and connect the drainage to storm water structures as indicated on the drawings.
- D. Gravel Base: Install a minimum of 6" of base gravel across the subgrade (including maximum 1.5" of finish drainage stone). Prior to gravel placement, cover entire subgrade and wrap all drainage trenches with a minimum 3 oz geotextile fabric. Grade finished surface of gravel base to a tolerance of + 0.5" across the entire surface, with variations of less than 0.25" in any 10 lineal feet. The Owner, or owner's representative will observe the gravel installation and inform the contractor of visual acceptance of the finished gravel conditions. Acceptance of the finished gravel is required before the contractor can commence carpet installation. The Owner reserves the right to independently inspect and test the finished gravel surface, as it deems appropriate, including employing a certified surveyor to assure elevation conformance and/or a geotechnical firm to test gravel permeability. Such acceptance, however, does not relieve the Bidder of responsibility for complying with these Specifications.
- E. Drainage Testing: Contractor must provide drainage testing of the prepared stone base prior to proceeding with the installation of the carpet system. Contractor to provide a minimum of 4 infiltration tests equally spaced across the surface. The Owner must be given minimum 72 hours advance notice of said test. Owner shall witness the test. Contractor must provide written summary report of test results indicating that the minimum specified drainage requirements have been met. Such testing does not relieve the contractor of responsibilities that the final product (installed carpet and infill system) must also meet the minimum specified drainage requirements. Drainage

Testing must be performed in accordance with ASTM F2898-11 Standard Method for Permeability of Synthetic Turf Sports Field Base Stone and Surface System by Non-confined Area Flood Method”

3.3 INSTALLATION

- A. The Owner reserves the right to inspect the subbase by means of a laser level. Based on the owner's report of the subbase, the Contractor shall fine grade the subbase, including properly rolling and compacting the base, until deemed suitable by the owner.
- B. The contractor shall thoroughly inspect all materials delivered to the site, both for quality and quantity, to assure that the entire installation shall have sufficient material to maintain proper sand/rubber ratios.
- C. Synthetic turf shall be loose laid across the surface, stretched, and attached to the perimeter edge detail. Turf must also be attached via a nailer board to the curbs.
- D. Seams shall be adhered using reinforcing tape and high-grade outdoor synthetic turf adhesive. Seams may also be sewn at the contractor's choice. Seams shall be flat, tight, and permanent with no separation or fraying.
- E. Infill materials must be brought to the site and stockpiled for inspection by the owner. Infill materials must be mixed by an experienced installer. The sand/rubber blend shall be applied in numerous thin lifts using special broadcasting equipment. The turf shall be raked and brushed properly as the mixture is applied. The infill material shall be installed to a depth per above specifications. The mixture can only be applied when dry. (Review by engineer does not relieve contractor of responsibility to ensure that the synthetic turf system meets the specified impact attenuation requirements).

3.4 CLEAN UP

- A. Contractor shall provide the labor, supplies and equipment as necessary for final cleaning of surfaces and installed items.
- B. All usable remnants of new material shall become the property of the Owner.
- C. The Contractor shall keep the area clean throughout the project and clear of debris.
- D. Surfaces, recesses, enclosures, etc., shall be cleaned, as necessary, to leave the work area in a clean, immaculate condition ready for immediate occupancy and use by the Owner.

END SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 328400

UNDERGROUND IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
 - 1. Section 329200 "Turf and Grasses" for turf mix and installation.
 - 2. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.2 DESCRIPTION OF WORK

- A. The system shall provide 100% coverage and uniformly irrigate all zones and perform as required:
 - 1. The contractor shall provide an underground irrigation system drawing and adhere to these specifications.
 - a. Automatic irrigation system including piping, fittings, sprinkler heads, control wire, quick coupler valves, controllers, and accessories.
 - b. Excavating and backfilling irrigation system work.
 - c. Testing and adjusting of system.
 - d. "As – Built" drawings
 - e. Winterization – shutdown – spring start-up
 - 2. All work required by the contractor's plans and these specifications shall be accomplished by the Irrigation Contractor even though minor items required may not be specifically mentioned in the above listing.
- B. Drawings: The irrigation layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be by the Contractor. Modifications in the field at time of installation to allow for actual on-site conditions are acceptable. Proper spacing of sprinkler heads will be required to obtain satisfactory coverage. Minor adjustments in the system layout will be permitted to clear fixed obstructions. Any major revisions to the irrigation system shall be submitted in writing to the owner for approval. The final system layout must be acceptable to the owner.
- C. Verification of Plans and Specifications: It shall be the responsibility of the Irrigation Contractor to carefully examine the irrigation zones and specifications relating to this work for completeness, accuracy, and clarity. Any conflict errors or clarifications request shall be immediately brought to the attention of the owner's representative for written interpretation or instructions. No claim for increased compensation for additions, changes, or alterations will be considered unless written authorization is granted by

Owner's representative. Otherwise any additional materials and/or labor due to existing conditions shall be furnished under this contract.

- D. Irrigation Contractor is responsible for obtaining all permits required for installation of this work.
- E. Irrigation contractor to ensure that the general contractor provides required power to irrigation system.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide underground irrigation system as a complete unit produced by a single acceptable manufacturer, including heads, valves, controls, and accessories.
- B. Work and materials shall be in accordance with the latest rules, and other applicable state or local laws. Nothing in the Contract Documents is to be construed to permit work not conforming to these codes.
- C. Contractors Qualifications: Bidding contractors shall have a minimum of three years experience in the construction of a job of similar size and complexity.
 - 1. Provide the General Contractor a list of five equivalent, irrigation system installations, performed in the last five years, incorporating the following information:
 - a. Name and address of product.
 - b. Name and address of Owner.
 - 1) Contact person
 - c. Name and address with whom contact was with.
 - 1) Contact person
- D. Requirements of regulatory agencies and utilities:
 - 1. System shall comply with the latest requirements of all state and local codes and ordinances.
 - 2. System shall comply with the latest rules and requirements by all utility companies involved.
 - 3. Nothing in the contract documents is to be constructed to permit work not conforming to these rules, codes and ordinances.
- E. Electrical devices shall carry Underwriter's Laboratory labels.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for underground irrigation system.

- B. Record Drawings: After completion of the work and before final acceptance, a set of scaled, reproducible record drawings, and two sets of prints showing the location of the complete work shall be submitted to the Owner. Final payment and any retainage will not be released until these drawings are submitted and accepted by the Owner.
- C. Submit a weekly irrigation schedule based on an annual evapotranspiration rate, average rainfall amounts etc.

1.5 WARRANTY

- A. The contractor shall furnish a manufacturer's written warranty to the effect that all heads, valves, and controllers will be warranted for a period of no less than one year to be free from defects and faulty workmanship, and that any defective heads, valves, or controllers shall be promptly repaired or replaced without additional cost to the Owner in accordance with that warranty.
- B. All materials other than those referred to in Paragraph A above shall be warranted for a period of one full year from the date of final acceptance by the Owner.
- C. All installation labor used on this project will be warranted for one full year from date of final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Hunter Industries
 - 2. Rain Bird Sprinkler Mfg. Corp.
 - 3. The TORO Co., Irrigation Div.

2.2 MATERIALS

- A. Pressure Pipe: Comply with following:
 - 1. Unplasticized PVC pipe, Class 200 SDR21, ASTM D 2241.
 - a. 3" and larger, may be installed with slip joint ring gasket seals.
 - b. 2-1/2" and smaller shall be installed using solvent weld joints.
 - 2. Dripper Tubing with Pressure Compensating Emitters
- B. Circuit Pipe (downstream from circuit valves): Comply with following:
 - 1. Unplasticized PVC pipe, Class 200 SDR-21, ASTM D 2241.
 - 2. Virgin Polyethylene tubing, 80-pound minimum N.S.F. approved, ASTM D2239.
- C. Pipe Fittings: Comply with following:

1. For PVC plastic pipe, Approved socket fittings to be used with ASTM D2241 pipe and ASTM D2564 solvent cement.
 2. For polyethylene (PE) plastic pipe, plastic insert fittings, ASTM D2609.
- D. Valves: Manufacturer's standard, of type and size indicated, and as follows:
1. Provide PVC or cast bronze bodies, as called for on plans.
 2. Proved pressure regulating valves, if called for on plans.
 3. Manual Circuit Valves: Globe valves.
 4. Key Operated Valves: Manual valves, fitted for key operation.
 - a. Furnish 2 valve keys, 3 feet long with tee handles and key end to fit valves.
 5. Automatic circuit valves: Globe valves operated by low-power solenoid, normally closed, manual flow adjustment.
 6. Automatic Drain Valves: Designed to open for drainage when line pressure drops below 3 psi.
- E. Backflow Preventer: As required by governing code.
- F. Sprinkler Heads: Manufacturer's standard unit designed to provide uniform coverage over entire area of spray shown on drawings at available water pressure, as follows:
1. Bubbler: Fixed pattern, pressure compensating type.
 2. Shrubbery: Fixed pattern, pressure compensating type
 3. Pop-Up Spray: Fixed pattern, with screw-type flow adjustment or pressure regulating nozzle and stainless steel retraction spring.
 4. Pop-Up Rotary Spray: Gear drive, full circle and adjustable part circle type.
 5. Pop-Up Rotary Impact: Impact drive, full circle and part circle as indicated.
 6. Above Ground Rotary Impact: Impact drive, full circle and part circle as indicated.
- G. Valve Box: Industrial Grade Plastic.
- H. Valve Cover and Frame: Industrial Grade Plastic.
- I. Wiring: UF type single strand wire #14 with white common ground and others color coded.
1. Connections: Suitable moisture proof device; 3M pack or Rain Bird snap type connector.
- J. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3" maximum to 3/4" minimum.
- 2.3 AUTOMATIC CONTROL SYSTEM
- A. General: Furnish low voltage system manufactured expressly for control of automatic circuit valves of underground irrigation systems. Provide unit of capacity to suit number of circuits as indicated.

- B. Exterior Control Enclosure: Manufacturer's standard weatherproof enclosure with locking cover, complying with NFPA 70 (National Electric Code).
- C. Interior Control Enclosure: Manufacturer's standard with locking cover, complying with NFPA 70.
- D. Transformer: To convert building service voltage to control voltage of 24 volts.
- E. Circuit Control: Each circuit variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each circuit.
- F. Timing Device: Adjustable, 24-hour and 7 or 14-day clocks to operate any time of day and skip any day in a 7 or 14-day period.
 - 1. Allow for manual or semi-automatic operation without disturbing preset automatic operation.

PART 3 - EXECUTION

3.1 SYSTEM DESIGN

- A. Design Pressures: As indicated on contractor's drawings, at connection to building system and at last head in circuit.
- B. Location of Heads: As indicated on drawings. Make minor adjustments as necessary to avoid plantings and other obstructions.
- C. Minimum Water Coverage:
 - 1. Turf areas, 100%
 - 2. Planting areas, 100%.
 - 3. Layout may be modified, if necessary to obtain coverage, to suit manufacturer's standard heads. Do not decrease number of heads indicated on contractor's drawings unless otherwise acceptable to Architect/Owners Representative.

3.2 TRENCHING AND BACKFILLING

- A. General: Excavate straight and true with bottom uniformly sloped to low points.
 - 1. Protect existing lawns and plantings. Remove and replant as necessary to complete installation. Replace damaged lawn areas plants and mulch with new to match existing.
- B. Trench Depth: Excavate trenches to a depth of 3" below invert of pipe, unless otherwise indicated.
- C. Minimum Cover: Provide following minimum cover over top of installed piping:
 - 1. A minimum of 18" cover shall be held over all main lines and lateral lines 1" thru 2" in diameter, and a minimum of 24" of cover for pipe sizes 2-1/2" thru 3" diameter.
 - 2. Pipe sizes between 4" and 6" in diameter should have a minimum of 30" of cover.

- D. Backfill: Backfill with clean material from excavation. Remove organic material as well as rocks and debris larger than 1" diameter. Place acceptable backfill material in 6" lifts, compacting each lift.
- E. Existing Lawns: Where trenching is required across existing lawns, uniformly cut strips of sod 6" wider than trench. Remove sod in rolls of suitable size for handling and keep moistened until replanted.
- F. Backfill trench to within 6" of finished grade. Continue fill with acceptable topsoil and compact to bring sod even with existing lawn.
- G. Replant or replace sod within 7 days after removal, roll and water generously.
- H. Reseed and restore to original condition any sod areas not in healthy condition equal to adjoining lawns 30 days after replanting.
- I. Pavements: Where existing pavements must be cut to install irrigation system, cut smoothly to straight lines 6" wider than trench.
 - 1. Excavate trench to required depth and width.
 - 2. Remove cut-out pavement and excavated material from site.
 - 3. At walkways, jack piping under paving material, if possible.
 - 4. Backfill with dry sand fill material, placing in 6-inch lifts.
 - 5. Repair or replace pavement cuts with equivalent materials and finishes.

3.3 PULLING PIPE AND WIRE

- A. Contractor may elect to install the irrigation pipe and electrical wire by means of vibratory plow. Starting and finishing holes for his method of installation shall not exceed a 1'-0" by 3'-0" opening. These excavations and other necessary excavations for installation of valves, sprinkler heads, connections, etc., shall be backfilled immediately after work is completed with sand or pea rock to preclude future settlement.

3.4 INSTALLATION

- A. General: Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.
- B. Connection to Main: Connect to existing building piping in location indicated.
 - 1. Install new tee, valve, and union.
 - 2. Connect to existing stub. Install new valve and union.
 - 3. Connect to existing stub with union.
- C. Maintain uninterrupted water service to building during normal working hours. Arrange for temporary water shut-off with Architect/Engineer.
- D. Backflow Preventer: Provide union on downstream side. Install approved back flow prevention device as directed by manufacturer and in a manner approved by state and local codes.

- E. Water Hammer Arrester: Install between connection to building main and circuit valves, inside building or in valve box as indicated.
- F. Circuit Valves: Install in valve box, arranged for easy adjustment and removal.
 - 1. Provide union on downstream side.
 - 2. Adjust automatic control valves to provide flow rate or rated operating pressure required for each sprinkler circuit. If an over pressure condition exists, contractor shall install, at his expense, such pressure compensation devices as are necessary to bring the circuit or heads into proper operating range.
- G. Piping: Lay pipe on solid subbase, uniformly sloped without humps or depressions.
 - 1. For circuit piping, slope to drain valve at least 1/2" in 10' or run.
 - 2. At wall penetrations, pack the opening around pipe with non-shrink grout. At exterior face, leave a perimeter slot approximately 1/2" wide by 3/4" deep. Fill this slot with backer rod and an acceptable elastomeric sealant. Repair below grade waterproofing disturbed by this work and make penetration watertight.
 - 3. Install PVC pipe in dry weather when temperature is above 40 degrees F in strict accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperature above 40 degrees F before testing, unless otherwise recommended by manufacturer.
 - a. Allow joints to cure at least 24 hours at temperature above 40 degrees F before testing, unless otherwise recommended by manufacturer.
- H. Drain Pockets: Excavate to sizes indicated. Backfill with acceptable drain material to 12" below grade. Cover drain material with a sheet of 30-pound Asphalt saturated felt and backfill remainder with excavated material.
 - 1. Restore lawns or plantings disturbed by this work.
- I. Sprinkler Heads: Flush circuit lines with full head of water and install heads after hydrostatic test is completed.
 - 1. Install lawn heads at manufacturer's recommended heights.
 - 2. Install shrubbery heads at heights indicated.
 - 3. Locate part-circle heads to maintain a minimum distance of 4" from walls and 2" from other boundaries, unless otherwise indicated.
- J. Wiring: Make all wire splices in valve boxes.
- K. Dielectric Protection: Use dielectric fittings at connection where pipes of dissimilar metal are joined.
- L. Closing of Pipe and Flushing Lines: Cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of the installation. Thoroughly flush out all main water lines before installing valves. Thoroughly flush out all lateral lines after installation and before attaching heads.

3.5 TESTING AND TRAINING

- A. General: Notify Architect/Engineer in writing when testing will be conducted. Conduct tests in presence of Architect/Engineer.
- B. Hydrostatic Test: Test water piping and valves, before backfilling trenches, to a hydrostatic pressure of not less than 100 psi. Piping may be tested in sections to expedite work. Remove and repair piping, connections, valves which do not pass hydrostatic testing.
- C. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position.
 - 1. Demonstrate to Architect/Engineer that system meets coverage requirements and that automatic controls function properly.
 - 2. Coverage requirements are based on operation of one circuit at a time.
- D. After completion of grading, seeding or sodding, and rolling of grass areas, carefully adjust lawn sprinkler heads so they will be flush with or not more than 1/2" above finish grade.
- E. Personnel training
 - 1. Contractor shall be responsible for the training of as many personnel as the Owner shall deem necessary.
 - 2. Contractor shall be responsible for one starting and one winterizing of the system during the appropriate times of the year after final acceptance by the Owner as part of the training of the Owner's personnel.
 - 3. Contractor shall include general troubleshooting and operation of the system with reference to head, valve, and controller operation.
 - 4. Contractor shall furnish a complete operation and maintenance manual to the Owner's personnel. This manual shall include repair parts lists, assembly instructions, troubleshooting guides, programming instructions, and recommended precipitation rates.

3.6 ADJUSTMENTS

- A. After completion of grading, seeding or sodding, if applicable, Contractor shall return to the job site to perform any final adjustments to the system, which might be deemed necessary.
- B. The contractor will be responsible for any pressure testing and start up of the system when construction is complete. The contractor will also be responsible for the winterization of the system after the first season of operation.

END SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329113

PLANTING SOILS

PART 1 - GENERAL

1.1 GENERAL PROVISION

- A. Contract Documents and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for manufactured planting soils (planting soils) including, but not limited, to the following:
 - 1. Evaluation of rough subgrade water infiltration.
 - 2. Planting soil material acquisition.
 - 3. Testing and analysis for specification conformance.
 - 4. Inspection and testing of subgrade for preparation of subgrade.
 - 5. Preparation of mixes and testing for conformance.
 - 6. Installation and placement of soils.
 - 7. De-compaction and re-compaction of soils.
 - 8. Final in-place testing of soils.
 - 9. Coordination with other contractors.
 - 10. Clean-up.

1.3 RELATED SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 - 1. Section 328400 "Underground Irrigation System" for irrigation components and installation.
 - 2. Section 329113.23 "Structural Soil" for structural soil mix and installation.
 - 3. Section 329200 "Turf and Grasses" for turf mix and installation.
 - 4. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.4 DEFINITIONS

- A. ASA: American Society of Agronomy.

1.5 QUALITY ASSURANCE/DEFINITIONS

- A. Testing/Testing Agency
 - 1. Refer to Section 014000, Quality Requirements.
 - 2. Refer to Section 329300 Trees, Plants and Ground Covers

3. Refer to this section, 1.6 B.

1.6 TESTING, SUBMITTALS, MOCK-UPS AND INSPECTIONS

- A. Certificates: Contractor shall submit certification that all soil blend components and all soil blends meet all environmental standards of the State of Ohio for use in residential zones.
- B. Testing for Planting Soil, and: Testing provided by the contractor is required at the following intervals:
 1. Testing of individual base components for all soil mixes. Tests are as described in Section 329113, 1.6, C.
 2. After test results for components have been accepted, create sample mixes of each planting soil mix and perform tests described in Section 329113, 1.6, C.
 3. After the test results for planting soil mixes have been accepted, and during the placement of planting soils, test every 100 cubic yards of soil mix delivered to the job site. Testing applies to all soil layers of the planting profile.
- C. Test Reports: Submit certified reports for tests as described in this Section.
 1. Mechanical gradation (sieve analysis) shall be performed and compared to the USDA Soil Classification System. Percent clay (0.002 mm) shall be reported separately in addition to silt (ASTM D-422-63, hydrometer method).
 2. The silt and clay content shall be determined by a Hydrometer Test of soil passing the #270 sieve.
 3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.
 4. Tests shall be conducted in accordance with Recommended Soil Testing Procedures for the Northeastern United States, 2nd Edition, Northeastern Regional Publication No. 493; Agricultural Experiment Stations of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont and West Virginia; Revised - December 15, 1995. Tests include the following:
 - a. Test for soil Organic Matter by loss of weight on ignition, as described in Northeastern Regional Publication No. 493, p. 59.
 - b. Test for soil CEC by exchangeable acidity method as described in Northeastern Regional Publication No. 493, p. 64.
 - c. Test for soil Soluble Salts shall be by the 1:2 (v:v) soil:water Extract Method as described in Northeastern Regional Publication No. 493, p. 74.
 - d. Test for Buffer pH by the SMP method as described in Northeastern Regional Publication No. 493, p.
 5. Certified reports on analyses from producers of composted organic materials are required, particularly when sources are changed. Analyses will include all tests for criteria specified in 2.01F.
 6. Density Tests: ASTM D1556 Density of Soil and Rock in Place Using Sand Cone Method. ASTM D698 Test Method for Laboratory Compaction Characteristics of

Soil Using Standard Effort.

- a. In-place density tests shall be carried out at a rate of one test per 500 square feet for Planting.
 7. Testing Agencies: Testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications.
 - D. Samples: Prior to ordering the below listed materials, submit representative samples to the Construction Manager and Architect for selection and approval. Do not order materials until Construction Manager's and Architect's approval has been obtained. Delivered materials shall closely match the approved samples.
 1. Organic amendment (Compost): duplicate samples of 1 gallon.
 2. Base Loam: duplicate samples of 1 gallon.
 3. Coarse Sand: duplicate samples of 1 gallon.
 - E. Sources for Soil Components and Soil Mixes: Submit information identifying sources for all soil components and the firm responsible for mixing of soil mixes.
 1. Construction Manager and Architect shall have the right to reject any soil supplier.
 2. Soil mix supplier shall have a minimum of five years experience at supplying custom planting soil mixes.
 3. Submit supplier name, address, telephone and fax numbers and contact name.
 4. Submit certification that accepted supplier is able to provide sufficient quantities of materials and mixes for the entire project.
 - F. Inspection:
 1. The Contractor shall not place Planting Soil onto subgrade prior to inspection and approval of Architect for compliance. The Contractor shall request inspection before proceeding.
 2. The Contractor shall not plant any plant material prior to inspection and approval of Architect for compliance with soil depth and compaction specifications. The Contractor shall request inspection before proceeding.
- 1.7 DELIVERY, STORAGE AND HANDLING
- A. In addition, the following provision is established: Material shall not be handled or hauled, placed or compacted when it is wet as after a heavy rainfall, early spring or is frozen. Soil shall be handled only when the moisture content is compliant with Section 329113 1.7.G. The Construction Manager and Architect shall be consulted to determine if the soil is too wet to handle.
 - B. Store and handle packaged materials in strict compliance with manufacturer's instructions and recommendations. Protect all materials from weather, damage, injury

and theft.

- C. Sequence deliveries to avoid delay. On-site storage space is permissible only with written notice from Construction Manager. Deliver materials only after preparations for placement of planting soil have been completed.
- D. Prohibit vehicular and pedestrian traffic on or around stockpiled planting soil.
- E. Soil that is to be stockpiled longer than two weeks, whether on or off site, shall not be placed in mounds greater than six feet high. If soil stockpiles greater than six feet high are present longer than two weeks, then the contractor shall break down and disperse soil so that mounds do not exceed the six-foot height restriction for longer than two weeks.
- F. Vehicular access to the site is restricted. Before construction, the Contractor shall submit for approval a plan showing proposed routing for deliveries and site access.
- G. Soil Moisture Content:
 - 1. Contractor shall not move, blend or grade soil when moisture content is so great that free moisture is apparent, nor when it is so dry that dust will form in the air or that clods will not break readily, nor when it is frozen. Apply water, if necessary, or allow to dry to bring soil moisture between 60% of optimum moisture content and optimum moisture content as determined by ASTM D698 for compaction, grading and plantings.
 - 2. Field Soil Moisture Test:
 - a. Form soil in palm of hand, if soil retains shape and crumbles upon touching, the soil may be worked.
 - b. If the soil will not retain shape it is too dry and should not be worked.
 - c. If the soil retains shape and will not crumble, it is too wet and should not be worked.
 - d. If the soil glistens or free water is observed when the sample is patted in the palm of hand the soil is too wet and should not be worked.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General:
 - 1. All plant mix material shall fulfill the requirements as specified and be tested to confirm the specified characteristics.
 - 2. Samples of individual components of soil mixes in addition to blended soil mixes including mulch materials shall be submitted by the Contractor for testing and analysis to the approved testing laboratory. Comply with specific materials requirements specified.
 - a. No base component material or soil components for soil mixes shall be used until certified test reports by an approved agricultural chemist have

been received and approved by the Construction Manager and Architect.

- b. As necessary, make any and all soil mix amendments and resubmit test reports indicating amendments until approved.
3. Construction Manager and Architect may request additional testing by Contractor for confirmation of mix quality and/or soil mix amendments at any time until completion. Changes in mix ratios may be required.

B Soil Testing and Soils Testing Report Submittal:

1. All testing of the soil mix components shall be carried out by the Soils Testing Laboratory. Recommendations for amending and/or correcting the soil mix will be provided to the Contractor by the Soils Testing Laboratory after approval by the Architect.
2. Failure of any material by testing and/or amendment procedure to meet Specification requirements shall require the Contractor to seek another source for the failed material and the initiation of all testing procedures for the new replacement material shall immediately take place.
3. The Contractor shall be responsible for recognizing that these critical project materials warrant timely and serious attention, that the testing process to achieve Approved materials should be considered a lead time item, and that under no circumstance shall failure to comply with all specification requirements be an excuse for “staying on project construction schedule.”

C Soil Samples: Submit 1-gallon planting soil samples in two phases. Submit samples concurrent with horticultural soil test reports in both phases. Submit as phase one, planting soil base components for approval. Only after approval of phase one components, submit as phase two, soil blend mixes / mediums for approval. All reports must be from recent analyses, less than 90 days old, and represent materials that are available for delivery to the site.

1. Phase One Submittals of Planting Soil Base Components:
 - a. Base Loam.
 - b. Organic Amendment Materials (Compost).
 - c. Coarse Sand.
2. Phase Two Submittals of Planting Mediums: mixing and batching of soil mediums to be submitted in the same manner as bulk soils and will be prepared prior to delivery to site.
 - a. Planting Soil.
3. Submit reports for each of the above samples: Submit sample from each proposed source for testing and approval. Deliver samples to the testing laboratory and pay costs. Send report directly to Construction Manager and Architect.
4. Soil Sample Submittals: Sampling shall be done by the Contractor. The size of the samples and method of sampling shall be as follows: Samples shall be representative of the material to be brought to the site. Each sample shall be a

Composite Sample, which consists of 5 separate sub samples taken from a minimum of (5) different locations at each source and mixed together to make the test sample.

5. The Contractor shall schedule this testing in order to permit reasonable time for testing, evaluation, and approvals prior to scheduled installation.

D. Base Loam:

1. Base Loam as required for blending with sand and compost planting shall be a naturally occurring soil formed from geologic soil forming processes without admixtures of sand or organic matter sources (composts). Base Loam, which has been contaminated by incorporation of subsoil shall not be acceptable for use. Base Loam as required for the work shall be free of subsoil, large stones, earth clods, sticks, stumps, clay lumps, roots or other objectionable, extraneous matter or debris. Base Loam shall also be free of quack-grass rhizomes, *Agropyron Repens*, and the nut-like tubers of nutgrass, *Cyperus Esculentus*, and all other primary noxious weeds. Base Loam shall not be delivered or used for planting while in a frozen or muddy condition. Base Loam for mixing shall conform to the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	---	100
18	85	100
35	70	95
60	50	85
140	36	53
270	32	42
0.002mm	3	6

2. The ratio of the particle size for 80% passing (D₈₀) to the particle size for 30% passing (D₃₀) shall be 8 or less ($D_{80}/D_{30} < 8$). Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition. The organic content shall be between 4.0 and 8.0 percent by weight.
3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

E. Coarse Sand:

1. Sand for Planting Soil shall be uniformly graded medium to coarse sand consisting of clean, inert, rounded to sub-angular grains of quartz or other durable rock free from loam or clay, mica, surface coatings and deleterious materials with the following grain size distribution for material passing the #10 sieve:

U.S. Sieve Size Number	Percent Passing	
	Minimum	Maximum
10	100	--
18	60	80
35	25	45
60	8	20
140	0	8
270	0	3
0.002mm	0	0.5

2. Maximum size shall be one-inch largest dimension. The maximum retained on the #10 sieve shall be 20% by weight of the total sample.
3. The ratio of the particle size for 70% passing (D70) to the particle size for 20% passing (D20) shall be 3.0 or less ($D70/D20 < 3.0$). Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422.
4. pH shall be less than 7.5.

F. Leaf Yard Waste Compost (Organic Amendment):

1. Organic Matter for amending planting soils shall be a stable, humus-like material produced from the aerobic decomposition and curing of Leaf Yard Waste Compost, composted for a minimum of one year (12 months). The leaf yard waste compost shall be free of debris such as plastics, metal, concrete or other debris. The leaf yard waste compost shall be free of stones larger than 3\8", larger branches and roots. Wood chips over 1" in length or diameter shall be removed by screening. The compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria as reported by laboratory tests.
 - a. The ratio of carbon to nitrogen shall be in the range of 12:1 to 25:1.
 - b. Stability shall be assessed by the Solvita procedure. Protocols are specified by the Solvita manual (version 4.0). The compost must achieve a maturity index of 6 or more as measured by the Solvita scale. Stability tests shall be conducted by Woods End Research Laboratory, Mt. Vernon, Maine.

- c. Pathogens/Metals/Vector Attraction reduction shall meet 40 CFR Part 503 rule, Table 3, page 9392, Vol. 58 No. 32, and Commonwealth of Massachusetts 310 CMR 32.00 (for applications to soils with human activity).
- d. Organic Content shall be at least 20 percent (dry weight). One hundred percent of the material shall pass a 3/8-inch (or smaller) screen. Debris such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall not exceed one percent dry weight. Organic content shall be determined by weight loss on ignition for particles passing a number 10 sieve according to procedures performed by the West Experiment Station at the University of Massachusetts, Amherst or equal as follows. A 50-cc sub-sample of the screened and mixed compost is ground to pass the number 60 sieve. Two to three grams (+ 0.001g) of ground sample, dried to a constant weight at 105 degrees C is placed into a muffle furnace. The temperature is slowly raised (5C/minute) to 450C and maintained for three hours. The sample is removed to an oven to equilibrate at 105C and the weight is taken. Organic matter is calculated as loss on ignition.
- e. pH: The pH shall be between 6.5 to 7.4 as determined from a 1:1 soil-distilled water suspension using a glass electrode pH meter American Society of Agronomy *Methods of Soil Analysis*, Part 2, 1986.
- f. Salinity: Electrical conductivity of a one to five soil to water ratio extract shall not exceed 2.5 mmhos/cm (dS/m).
- g. The compost shall be screened to 3/8-inch maximum particle size and shall contain no more than 3 percent material finer than 0.002mm as determined by hydrometer test on ashed material.
- h. Nutrient content shall be determined by the University of Massachusetts Soil Testing Laboratory or equivalent laboratory and utilized to evaluate soil-required amendments for the mixed soils. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Aluminum, Magnesium, Iron, Manganese, Lead, Soluble Salts, Cation Exchange Capacity, soil reaction (pH), and buffer pH.

2.2 PLANTING SOIL MIXES

- A. Uniformly mix ingredients by windrowing/tilling on an approved hard surface area or by alternately processing materials through a screening plant. All soil components and Organic Amendment shall be maintained moist, not wet, during mixing. Amendments shall not be added unless approved to extent and quantity by the owner and additional tests have been conducted to verify type and quantity of amendment is acceptable. Percentages of components, unless otherwise noted, will be established upon completion of individual test results for components of the various mixes.
- B. After component percentages are determined by the Testing Laboratory, each planting soil mix shall be tested for physical and chemical analysis. Component percentages may be modified at any time by the Architect dependent upon the results of testing of the various components or final blends.
- C. Planting Soil:

1. Planting Soil shall consist of a combination of approximately equal parts by volume: Coarse Sand(S), Base Loam (L) and Organic Amendment (C) (1S:1L:1C). The following gradation for material passing a Number 10 Sieve shall be achieved in the final mix.

U.S. Sieve Size No.	Percent Passing	
	Minimum	Maximum
10	100	
18	85	95
35	60	85
60	42	65
140	21	44
270	18	24
0.002 mm	2	4

2. Maximum size shall be one half-inch largest dimension. The maximum retained on the #10 sieve shall be 10% by weight of the total sample. The ratio of the particle size for 80% passing (D₈₀) to the particle size for 30% passing (D₃₀) shall be 6 or less ($D_{80}/D_{30} < 6$). The final mix shall have an organic content between 5 and 7 percent by weight. The final mix shall have a hydraulic conductivity of no less than 1.5 inches per according to test procedure ASTM D5856-95 (2000) hour when compacted to a minimum of 86 percent Standard Proctor ASTM D 698. Tests shall be by combined hydrometer and wet sieving in compliance with ASTM D422 after destruction of organic matter by ignition.
3. Chemical analysis shall be undertaken for Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium Magnesium, Aluminum, Iron, Manganese, Lead, Cation Exchange Capacity, Soluble Salts, acidity (pH) and buffer pH.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION EXAMINATION AND PREPARATION

- A. Reference Other Sections as necessary.
- B. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.
- C. Pre-Installation Examination Required: The Contractor shall examine previous work, related work, and conditions under which this work is to be performed and shall notify Architect in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Contractor accepts substrates, previous work, and conditions. The Contractor shall not place any planting soil until all work in adjacent areas is complete and approved by the Architect.

- D. Examination of Subgrade: The subgrade shall be examined by the Contractor prior to the start of soil placement and planting. Any deficiencies shall be noted and related to the Architect in writing prior to acceptance of the subgrade by the Landscape Contractor. Deficiencies include, but shall not be limited to the following:
 - 1. Construction debris present within the planting areas.
 - 2. The subgrade is at incorrect depths for installing the designed soil profile and drainage layer.
 - 3. Incomplete irrigation and/or subsurface drainage installation.
 - 4. Subgrade de-compacted and re-compacted according to Section 329113 3.3, B.
 - 5. Subgrade must infiltrate water at the rate of at least one inch per hour.
- E. Planting Soil Preparation: Refer to Section 329113, 2.2 for planting soil and mixtures. Examine soil and remove foreign materials, stones and organic debris over 1/2" in size. Mix-in fertilizers and amendments as required by tests and as approved by the Architect. All preparation and mixing shall be accomplished when the soil moisture content is compliant with Section 329113 1.7.G and at a moisture content approved by the Architect. If lime is to be added, it shall be mixed with dry soil before fertilizer is added and mixed.

3.2 MIXING OF PLANTING SOIL MIXES

- A. Soil blends shall be produced with equipment that blends together each component in a thorough and uniform manner.

3.3 BACKFILLING OF PLANTING SOIL

- A. Soil Placement Preparation:
 - 1. Verify that the plumbing for the irrigation system has been installed and accepted.
 - 2. Verify that the underdrainage system has been installed and accepted.
 - 3. Notify the Architect of soil placement operations at least seven (7) calendar days prior to the beginning of work.
 - 4. The plant stock shall be placed simultaneously with the planting soil as described in Section 3.3 C. The Architect will stake trees and shrubs during placement of the planting soil.
 - 5. Verify that the subgrade passes the minimum water infiltration requirement.
- B. Subgrade De-compaction and Re-compaction
 - 1. In areas on-grade, the subgrade shall be de-compacted with excavator or backhoe to depth of 12 inches. The Contractor shall re-compact subgrade to between 90 and 92% Standard Proctor.
 - 2. De-compaction and re-compaction shall occur just prior to placement of drainage layer and after all wheeled vehicles have been excluded from area.
 - 3. Moisture content must be compliant with Section 329113 1.7.G.
- C. Placement of Planting Soil:

1. Placement of Planting Soil and plant stock shall be carried out simultaneously to prevent excessive traffic over soil lifts and the final grade so as to prevent the creation of undesirable soil compaction. The contractor shall install plants simultaneously with the installation of the lower soil layers. The upper soil layers shall not be installed before all plants are installed and before the acceptance by the Architect.
2. Planting Soil shall be placed in lifts not to exceed 8 inches in thickness and compacted to meet minimum and maximum requirements as specified below:
 - a. Planting Soil shall be compacted to between 84 and 86 percent Standard Proctor.
 - b. In all cases, the soil being placed shall be in a dry to damp condition. No wet soils shall be placed. All testing of in-place density for planting materials shall be made according to ASTM D1556.
3. Prevention of compacted soils can be accomplished by beginning the work in corner, against walls, or the center of isolated beds, and progressing outwards towards the borders.
4. Planting Soils shall never be moved or worked when wet or frozen.
5. The Contractor shall place barricades as required to prevent any unnecessary compaction of planting soil from vehicles, equipment, or pedestrian traffic.

3.4 PROTECTION

- A. Protect newly graded areas from traffic, freezing and erosion. Keep free of trash, debris or construction materials from other work.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to a depth as directed by the Architect; reshape and re-compact at optimum moisture content to the required density.
- C. Where settling occurs, before final acceptance or during the warranty period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the Owner.

3.5 COORDINATION AND EXCESS MATERIALS

- A. Coordinate activities with other project contractors so that there is no soil disturbance from traffic or other construction activities subsequent to placement.
- B. Excess Planting Soil Mixtures and Materials: Remove the excess planting soil mixture and materials from the site at no additional cost to the Owner unless otherwise requested.

3.6 POST-INSTALLATION TESTING

- A. In-place density testing is required in all areas. Planting Soils may be tested by the test methods below.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP #6 – February 21st, 2020
Kleingers #190725.000

- B. Acceptable Density Test Methods: ASTM D1556 Density of soil and rock in place using Sand Cone Method", ASTM D6398-10 Nuclear Methods or ASTM D2167-08 Rubber Balloon method. ASTM D698 Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329113.23

STRUCTURAL SOIL

PART 1 - GENERAL

1.1 SUMMARY

- A. The work of this Section consists of all Structural Soil work and related items as indicated on the Drawings or as specified herein and includes, but is not limited to the following:

CU-Soil™ is a proprietary material patented by Cornell University (US Patent #5,849,069) and marketed under the registered trademark, CU-Structural Soil®. Only licensed companies are authorized to produce this material, meeting the specifications described in this text. For a list of licensed CU Soil™ producers, call AMEREQ, INC. at 800-832-8788.

- B. Related Sections:

1. Section 329113 "Planting Soils" for plant soil mix and installation.
2. Section 329300 "Plants" for installation of plant material.

1.2 REFERENCES AND STANDARDS

- A. The following references are used herein and shall mean:

1. AOAC: Association of Official Agricultural Chemists.
2. ASTM: American Society of Testing Materials.
3. ASHTO: American Association of State Highway and Transportation Officials.
4. Standard Specifications: Regional or Municipal Standard Specifications Documentation for the location of proposed usage.
5. USDA: United States Department of Agriculture.

1.3 SAMPLES AND SUBMITTALS

- A. At least 30 days prior to ordering materials, the Contractor shall submit to the Architect, representative samples, certificates, manufacturer's literature and certified tests for materials specified below. No materials shall be ordered until the required samples, certificates, manufacturer's literature and test results have been reviewed and approved by the Architect. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Architect reserves the right to reject, on or after delivery, any material that does not meet these specifications.
- B. Submit 2 - one half cubic foot representative samples of Clay Loam and 2 - two cubic foot representative samples Structural Soil mixes in this section for testing, analysis and approval. Submit one set of samples for every 500 CY of material to be delivered. In the event of multiple source fields for Clay Loam, submit a minimum of one set of

samples per source field or stockpile. Samples shall be taken randomly throughout the field or stockpile at locations as directed by the Architect and packaged in the presence of the Architect. Contractor shall deliver all samples to testing laboratories and shall have the test results sent directly to the Architect. Samples shall be labeled to include the location of the source of the material, the date of the sample and the Contractors name. One of the two samples is to be used by the testing laboratory for testing purposes. The second sample of all Clay Loam and Structural Soil shall be submitted to the Architect at the same time as test analysis as a record of the soil color and texture.

1. Submit the locations of all source fields for Clay Loam.
 2. Submit a list of all chemicals and herbicides applied to the Clay Loam for the last five years and a list of all crops grown in the Clay Loam source fields for the last three years.
- C. Submit soil test analysis reports for each sample of Clay Loam and Structural Soil from an approved soil-testing laboratory. The test results shall report the following:
1. The soil testing laboratory shall be approved by the Architect. The testing laboratory for particle size and chemical analysis may be a public agricultural extension service agency or agricultural experiment station.
 2. Submit a mechanical analysis of the sample and particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm
Gravel	+2mm.
Sand	0.05 -2 mm.
Silt	0.002-0.05 mm.
Clay minus	0.002 mm.

Sieve analysis shall be performed and compared to USDA Soil Classification System.

Sieve analysis shall be done by a combined hydrometer and wet sieving using sodium hexametaphosphate as a dispersant in compliance with ASTM D422 after destruction of organic matter by hydrogen peroxide.

3. Submit a chemical analysis, performed in accordance with current AOAC Standards, including the following:
 - a. pH and Buffer pH.
 - b. Percent organic matter as determined by the loss of ignition of oven dried samples. Test samples shall be oven dried to a constant weight at a temperature of 230 degrees F, plus or minus 9 degrees.
 - c. Analysis for nutrient levels by parts per million including nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, magnesium, manganese, iron, zinc, calcium and extractable aluminum. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil as calculated by the amount of material to be added per volume of soil for the type of plants to be grown in the soil.

- d. Analysis for levels of toxic elements and compounds including arsenic, boron, cadmium, chromium, copper, lead mercury, molybdenum, nickel, zinc and PCB. Test results shall be cited in milligrams per kilogram.
 - e. Soluble salt by electrical conductivity of a 1:2 soil water sample measured in Millimho per cm.
 - f. Cation Exchange Capacity (CEC).
 - g. Carbon/Nitrogen Ratio.
4. Submit 5-point minimum moisture density curve AASHTO T 99 test results for each Structural Soil sample without removing oversized aggregate.
 5. Submit California Bearing Ratio test results for each Structural Soil sample compacted to peak standard density. The soaked CBR shall equal or exceed a value of 50.
 6. Submit measured dry-weight percentage of stone in the mixture.
 7. The approved Structural Soil samples shall be the standard for each lot of 500 cubic yards of material.
 8. All testing and analysis shall be at the expense of the Contractor.
- D. Maintenance Instructions: Prior to the time of Final Acceptance of the Work, submit maintenance instructions for the use, removal and replacement of Structural Soil for the licensor's (Amereq Corp.) use. The instructions shall be reviewed by the Architect as a pre-condition for Final Acceptance of the Work.
- E. Submit to the Architect for review a proposed plan and vertical section layout of all Structural Soil.
- F. Submit one cubic foot sample per each 500 cubic yards of required material, and for each sample, the following analysis for all Crushed Stone. The soil testing laboratory shall be approved by the Architect.
1. Provide a particle size analysis including the following gradient of mineral content:

USDA Designation	Size in mm
3	+76mm.
2-1/2	63-76mm
2	50-63mm
1-1/2	37-50mm
1	25-37mm
3/4	19-25mm
Fine gravel	2-19mm.
Sand	0.05 -2 mm
Silt	0.002-0.05 mm
Clay	minus 0.002 mm.

2. Provide the manufacturers analysis of the following:
 - a. Loose and rodded unit weight.
 - a. Bulk specific gravity and absorbency.
 - b. Stone dimension and surface texture description.

- c. Documentation of acceptance for use as DOT approved aggregate by the appropriate regional DOT.
 - 3. Losses from LA Abrasion tests not to exceed 40%.
 - 4. Minimum 90% with 2 or more fractured faces.
 - 5. Provide a percent pore space analysis defined as follows:
 - a. $(I\text{-Rodded Unit Weight divided by the Bulk Specific (gravity)} \times 10)$.
 - G. Submit one-pound sample of each type of fertilizer and 3 certificates showing composition and analysis. Submit the purchasing receipt for each fertilizer showing the total quantity purchased for the project prior to installation.
 - H. Submit the Landscape or Pavement Material Contractor's qualifications outlining projects of similar quality, schedule requirements and construction detailing over the last 5 years. Qualifications shall include: The names of all similar projects, year completed, location, description of the scope of work including the types and quantities of planting mix / pavement material installed and the name, address and telephone number of the owner or the owner's representative.
- 1.4 DELIVERY, STORAGE, AND HANDLING
- A. Do not deliver or place soils in frozen, wet, or muddy conditions. Material shall be delivered at or near optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698). Do not deliver or place materials in an excessively moist condition (beyond 2 percent above optimum compaction moisture content as determined by AASHTO T 99 (ASTM D 698).
 - B. Protect soils and mixes from absorbing excess water and from erosion at all times. Do not store materials unprotected from large rainfall events. Do not allow excess water to enter site prior to compaction. If water is introduced into the material after grading, allow material to drain or aerate to optimum compaction moisture content.
- 1.5 EXAMINATION OF CONDITIONS
- A. All areas to receive Structural Soil shall be inspected by the Contractor before starting work and all defects such as incorrect grading, compaction and inadequate drainage etc. shall be reported to the Architect prior to beginning this work.
 - B. The Contractor shall be responsible for judging the full extent of work requirements involved, including but not limited to the potential need for temporary storage and staging of soils, including moving soil stock piles at the site to accommodate scheduling of other work and the need to protect installed soils from compaction, erosion and contamination.
- 1.6 QUALITY ASSURANCE
- A. Qualifications of Landscape or Pavement Material Contractor: The work of this section shall be performed by a Landscape Contracting firm which has a minimum of 5 years experience successfully installing planting mix of a similar quality, schedule

requirement and construction detailing to this project. Proof of this experience shall be submitted as per paragraph, SAMPLES AND SUBMITTALS, of this Section.

PART 2 - PRODUCTS

2.1 CLAY LOAM

- A. Clay Loam shall be a "loam" based on the "USDA classification system" as determined by mechanical analysis (ASTM 0-422) and it shall be of uniform composition, without admixture of subsoil. It shall be free of stones greater than one-half inch, lumps, plants and their roots, debris and other extraneous matter over one inch in diameter or excess of smaller pieces of the same materials as determined by the Architect. It shall not contain toxic substances harmful to plant growth. It shall be obtained from naturally well-drained areas, which have never been stripped of top soil before and have a history of satisfactory vegetative growth. Clay Loam shall contain not less than 2% or more than 5% organic matter as determined by the loss on ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F., plus or minus 9 degrees.

- B. Mechanical analysis for a Loam / Clay Loam shall be as follows:

Textural Class	% of total weight.
Gravel	less than 5%
Sand	20 – 45%
Silt	20 – 50%
Clay	20- 40%

- C. Chemical analysis: Meet or be amended to meet the following criteria.

1. pH between 5.5 to 6.5.
2. Percent organic matter 2 -5% by dry weight.
3. Nutrient levels as required by the testing laboratory recommendations for the type of plants to be grown in the soil.
4. Toxic elements and compounds below the United States Environmental Protection Agency Standards for Exceptional Quality sludge or local standard; whichever is more stringent.
5. Soluble salt less than 1.0 Millimho per cm.
6. Cation Exchange Capacity (CEC) greater than 10
7. Carbon/Nitrogen Ratio less than 33:1.

- D. Loam or Clay Loam shall be the product of a commercial processing facility specializing in production of stripped natural topsoil. No topsoil shall come from USDA - classified prime farmland.

2.2 FERTILIZER

- A. Commercial fertilizer complying with State and United States fertilizer laws. Deliver fertilizer in original unopened containers, which shall bear the manufacturer's certificate of compliance covering analysis, which shall be furnished to the Architect. Fertilizer shall be formulated for mixing into the soil and be certified by the manufacturer to

provide controlled release of nitrogen continuously for a period of no less than 9 months and no more than 12 months.

- B. Fertilizer percentages of weight of ingredients and application rates shall be as recommended by the soil testing results.

2.3 SULFUR

- A. Sulfur, if required, shall be commercial granular, 96% pure sulfur, delivered in containers with the name of the manufacturer, material and analysis appearing in the container.
- B. Sulfur used to lower soil pH above 6.5 shall be ferrous sulfate formulation.
- C. Application rates shall be dependent on soil test results.

2.4 LIME

- A. Agricultural limestone, if required, containing a minimum of 85% carbonates. Minimum gradation: 100% passing 10 mesh sieve; 98% passing 20 mesh sieve; 55% passing 60 mesh sieve and 40% passing 100 mesh sieve.

2.5 CRUSHED STONE

- A. Crushed Stone shall be a DOT certified crushed stone. Granite and limestone have been successfully used in this application. 90-100 percent of the stone should pass the 1.5-inch sieve; 20-55 percent should pass the 1.0-inch sieve; and 10 percent should pass the 0.75-inch sieve. A ratio of nominal maximum to nominal minimum particle size of 2 is required.
- B. Acceptable aggregate dimensions will not exceed 2.5:1.0 for any two dimensions chosen.
- C. Minimum 90 percent with one fractured face, minimum 75 percent with two or more fractured faces.
- D. Results of Aggregate Soundness Loss test shall not exceed 18 percent.
- E. Losses from LA Abrasion tests shall not exceed 40%.

2.6 HYDROGEL

- A. Hydrogel shall be a potassium propenoate-propenamide copolymer (Gelscape® Hydrogel Tackifier) as manufactured by Amereq, Inc. 800-832-8788, or approved equal.

2.7 WATER

- A. The Contractor shall be responsible to furnish his own supply of water to the site at no extra cost. All work injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be free from impurities injurious to vegetation.

2.8 STRUCTURAL SOIL

- A. A uniformly blended mixture of Crushed Stone, Clay Loam and Hydrogel, mixed to the following proportion:

Material	Unit of Weight
Crushed Stone	100 units dry weight
Loam	as determined by the test of the mix (Approx. 20 units)
Hydrogel	0.035 units dry weight
Total moisture	AASHTO T-99/ASTM D698 optimum moisture

- B. The initial mix design for testing shall be determined by adjusting the ratio between the Crushed Stone and the Clay loam. Adjust final mix dry weight mixing proportion to decrease soil in mixture if CBR test results fail to meet acceptance (CBR # 50).

PART 3 - EXECUTION

3.1 MIX DESIGN

- A. Prepare sample Structural Soil mixes to determine the ratio of mix components. Submit for approval.
1. Submit samples and the test results of each mix component for approval. Based on samples and the analysis of the mix components, the Architect and the Contractor will jointly determine a mix ratio to be tested for conformance with the requirements of the specifications. For Structural Soil quantities greater than 500 cubic yards, test the mix ratio for each Clay Loam or Crushed Stone where the testing indicates a significant difference in physical analysis of the Clay Loam or Crushed Stone as determined by the Architect.
 2. The Contractor shall prepare the samples of the proposed mix ratio options and obtain soil test as described in above. Submit the samples of each of the mixes with the test results.
 3. The Architect may request additional Structural Soil mix ratio samples to be tested in the event that further refinement of the mix is necessary.
 4. Submit to the Architect proposed fertility amendment recommendations including amounts and types of fertilizers and pH adjustments for each mix ratio. Fertility adjustments shall be included as part of the mixing process.

3.2 SOIL MIXING AND QUALITY CONTROL TESTING

- A. All Structural Soil mixing shall be performed at the Contractor's yard using appropriate soil measuring, mixing and shredding equipment of sufficient capacity and capability to assure proper quality control and consistent mix ratios. No mixing of Structural Soil at the project site shall be permitted. Portable pugging may be used.
1. Maintain adequate moisture content during the mixing process. Soils and mix components shall easily shred and break down without clumping. Soil clods shall easily break down into a fine crumbly texture. Soils shall not be overly wet or dry.

The contractor shall measure and monitor the amount of soil moisture at the mixing site periodically during the mixing process.

2. A Mixing procedure for front-end loader shall be as follows:
 - a. On a flat asphalt or concrete paved surface, spread an 8 inch to 12-inch layer of crushed stone.
 - b. Spread evenly over the stone the specified amount of dry Hydrogel.
 - c. Spread over the dry Hydrogel and crushed stone a proportional amount of clay loam according to the mix design.
 - d. Blend the entire amount by turning, using a front-end loader or other suitable equipment until a consistent blend is produced.
 - e. Add moisture gradually and evenly during the blending and turning operation as required to achieve the required moisture content. Delay applications of moisture for 10 minutes prior to successive applications. Once established, mixing should produce a material within 1 % of the optimum moisture level for compaction.
 3. A pugging operation mixing procedure may be as follows:
 - a. Feed a known weight of crushed stone into the mixing trough.
 - b. Add Hydrogel as a slurry into trough and mix slurry and stone into a uniform blend.
 - c. Meter in soil in proper proportion of Clay loam Soil while stone-slurry mixture is in motion.
 - d. Add water to bring mixture to target moisture content after factoring in water from the slurry and the Clay-loam moisture.
 - e. Auger out to stock pile or transport vehicle (or into pit if using a portable pugging operation).
 4. Add soil amendments to alter soil fertility including fertilizers and pH adjustment at the time of mixing at the rates recommended by the soil test.
 - a. Soil pH shall be adjusted to fall within a value of 5.5 and 6.5 two months after mixing if the material is stored, unless mixing with a high pH stone. Once pavement is laid, no adjustment should be imposed.
 - b. Soil component Carbon / nitrogen ratio shall be adjusted to be less than 33:1 within two months after mixing.
- B. The Contractor shall mix sufficient material in advance of the time needed at the job site to allow adequate time for final quality control testing as required by the progress of the work. Structural Soil shall be stored in piles of approximately 500 cubic yards and each pile shall be numbered for identification and quality control purposes. Storage piles shall be protected from rain and erosion by covering with plastic sheeting.
- C. During the mixing process, the Contractor shall take two - one cubic foot quality control samples per 500 cubic yards of production from the final Structural Soil. The samples shall be taken from random locations in the numbered stockpiles as required herein. Each sample shall be tested for particle size analysis and chemical analysis as described above. Submit the results directly to the Architect for review and approval.

- D. The quality control sample Clay Loam-Crushed Stone ratio shall be no greater or less than 2% of the approved test sample as determined by splitting a known weight of oven dried material on a #4 sieve. In the event that the quality control samples vary significantly from the approved Structural Soil sample, as determined by the Architect, remix and retest any lot of soil that fails to meet the correct analysis making adjustments to the mixing ratios and procedures to achieve the approved consistency.

3.3 UNDERGROUND UTILITIES AND SUBSURFACE CONDITIONS

- A. Notify the Architect of any subsurface conditions which will affect the Contractor's ability to complete the work.
- B. Locate and confirm the location of all underground utility lines and structures prior to the start of any excavation.
- C. Repair any underground utilities or foundations damaged by the Contractor during the progress of this work. The cost of all repairs shall be at the Contractor's expense.

3.4 SITE PREPARATION

- A. Do not proceed with the installation of the Structural Soil material until all walls, curb footings and utility work in the area have been installed. For site elements dependent on Structural Soil for foundation support, postpone installation until immediately after the installation of Structural Soil.
- B. Install subsurface drain lines as shown on the Drawings prior to installation of Structural Soil materials.
- C. Excavate and compact the proposed sub-grade to depths, slopes and widths as shown on the Drawings. Maintain all required angles of repose of the adjacent materials as shown on the drawings. Do not over excavate compacted sub-grades of adjacent pavement or structures.
- D. Confirm that the sub-grade is at the proper elevation and compacted as required. Sub-grade elevations shall slope parallel to the finished grade and or toward the subsurface drain lines as shown on the drawings.
- E. Clear the excavation of all construction debris, trash, rubble and any foreign material. In the event that fuels, oils, concrete washout silts or other material harmful to plants have been spilled into the sub-grade material, excavate the soil sufficiently to remove the harmful material. Fill any over excavation with approved fill and compact to the required sub-grade compaction.
- F. Do not proceed with the installation of Structural Soil until all utility work in the area has been installed. All subsurface drainage systems shall be operational prior to installation of Structural Soils.
- G. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2" plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

1. Clean up all trash and any soil or dirt spilled on any paved surface at the end of each working day.
 2. Any damage to the paving or architectural work caused by the soils installation Contractor shall be repaired by the general Contractor at the soils installation Contractor's expense.
- H. Maintain all silt and sediment control devices required by applicable regulations. Provide adequate methods to assure that trucks and other equipment do not track soil from the site onto adjacent property and the public right of way.

3.5 INSTALLATION OF STRUCTURAL SOIL MATERIAL

- A. Install Structural Soil in 6-inch lifts and compact each lift.
- B. Compact all materials to peak dry density from a standard AASHTO compaction curve (AASHTO T 99). No compaction shall occur when moisture content exceeds maximum as listed herein. Delay compaction 24 hours if moisture content exceeds maximum allowable and protect Structural Soil during delays in compaction with plastic or plywood as directed by the Architect.
- C. Bring Structural Soils to finished grades as shown on the Drawings. Immediately protect the Structural Soil material from contamination by toxic materials, trash, debris, water containing cement, clay, silt or materials that will alter the particle size distribution of the mix with plastic or plywood as directed by the Architect.
- D. The Architect may periodically check the material being delivered and installed at the site for color and texture consistency with the approved sample provided by the Contractor as part of the submittal for Structural Soil. In the event that the installed material varies significantly from the approved sample, the Architect may request that the Contractor test the installed Structural Soil. Any soil which varies significantly from the approved testing results, as determined by the Architect, shall be removed and new Structural Soil installed that meets these specifications.
- E. Structural Soil shall not be stockpiled long-term. Any Structural Soil not installed immediately shall be protected by a tarp or other waterproof covering.

3.6 FINE GRADING

- A. After the initial placement and rough grading of the Structural Soil, but prior to the start of fine grading, the Contractor shall request review of the rough grading by the Architect. The Contractor shall set sufficient grade stakes for checking the finished grades.
- B. Adjust the finish grades to meet field conditions as directed.
1. Provide smooth transitions between slopes of different gradients and direction.
 2. Fill all dips and remove any bumps in the overall plane of the slope.
 - a. The tolerance for dips and bumps in Structural Soil areas shall be a 3" deviation from the plane in 10'.

3. All fine grading shall be inspected and approved by the Architect prior to the installation of other items to be placed on the Structural Soil.

- C. The Architect will inspect the work upon the request of the Contractor. Request for inspection shall be received by the Architect at least 10 days before the anticipated date of inspection.

3.7 ACCEPTANCE STANDARDS

- A. The Architect will inspect the work upon the request of the Contractor. Request for inspection shall be received by the Architect at least 10 days before the anticipated date of inspection.

3.8 CLEANUP

- A. Upon completion of the Structural Soil installation operations, clean areas within the contract limits. Remove all excess fills, soils and mix stockpiles and legally dispose of all waste materials, trash and debris. Remove all tools and equipment and provide a clean, clear site. Sweep, do not wash, all paving and other exposed surfaces of dirt and mud until the paving has been installed over the Structural Soil material. Do no washing until finished materials covering Structural Soil material are in place.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

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. Sodding.
- 2. Turf renovation.

- B. Related Requirements:

- 1. Section 328400 "Underground Irrigation System" for irrigation components and installation.
- 2. Section 329113 "Planting Soils" for soil mix and installation.
- 3. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Planting Soils."
- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer.
- 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. Include identification of source and name and telephone number of supplier.
- C. Product Certificates: For fertilizers, from manufacturer.
- D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf 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 Section 014000 "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 all of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Lawncare Manager.
 - c. Landscape Industry Certified Lawncare Technician.
 - 5. Pesticide Applicator: State licensed, commercial.

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 compliance 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" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. 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 materials with appropriate certificates.

1.9 FIELD 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: March 15 to June 1.
 - 2. Fall Planting: August 15 to October 15.
- 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.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

- A. Turfgrass Sod: Certified, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 100 percent pure seed, and completely free of noxious weeds and grasses. The mixture shall be as follows or an approved equal: (Mixture shall rate in NTEP's top ten. Contractor to provide information on grass seed stating it meets NTEP's top ten list)

1. 80-90 percent Turf-type Tall Fescue consisting of minimum 3 varieties (15 percent minimum for any variety).
2. 10-20 percent Kentucky Bluegrass.

2.2 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of quick release nitrogen source, phosphate, and potash. Apply nitrogen, phosphate and potash in the amounts recommended in the soil reports from a qualified testing agency.
- B. Slow-Release Fertilizer: Granular fertilizer consisting of a minimum of 50 percent water-insoluble nitrogen or coated nitrogen source, phosphate, and potash. Apply nitrogen, phosphate and potash in the amounts recommended in the soil reports from a qualified testing agency.

2.3 PESTICIDES

- A. General: Pesticide, registered and approved by the 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 Nonselective): 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 Nonselective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
 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. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 3. Uniformly moisten excessively dry soil that is not workable or which is 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 grade stakes set by others until directed to remove them.

3.3 TURF AREA PREPARATION

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Planting Soils."
- B. Placing Planting Soil: Place and mix planting soil per section 329113 "Planting Soils."
 - 1. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- D. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 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 soil or sod during installation. Tamp and roll lightly to ensure contact with soil, 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 slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:6 with wood pegs spaced as recommended by sod manufacturer but not less than two 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.

3.5 TURF RENOVATION

- A. Renovate 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.

- B. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
- C. 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.
- D. Mow, dethatch, core aerate, and rake existing turf.
- E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- H. Apply initial fertilizer 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.
 - 1. Initial Fertilizer: Commercial fertilizer applied according to manufacturer's recommendations.
- I. Apply sod as required for new turf.
- J. Water newly planted areas and keep moist until new turf is established.

3.6 TURF MAINTENANCE

- A. General: 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 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. 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: Use proposed irrigation system, or other turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
 - 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.

- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third 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 turf to a height of 2 to 3 inches.

- D. Turf Post-fertilization: Apply fertilizer after initial mowing and when grass is dry.

- 1. Use fertilizer that provides actual nitrogen of 1 lb/1000 sq. ft. to turf area.
 - 2. 2nd application fertilizer: apply six (6) weeks after seeding operations. Provide a high nitrogen slow release fertilizer with an analysis of 30-3-10 or similar. Apply at a rate to provide actual nitrogen of 1 lb/1000 sq. ft. to turf area.

3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:

- 1. 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.

- B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.8 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to 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 Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.9 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. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

- C. 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.

- D. Remove nondegradable erosion-control measures after grass establishment period.

The Banks – Phase 3B
Public Infrastructure Development – Parking Garage and Street Grid
BP #6 – February 21st, 2020
Kleingers #190725.000

3.10 MAINTENANCE SERVICE

- A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following periods:
 - 1. Sodded Turf: 90 days from date of Substantial Completion.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 329300

PLANTS

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. Plants.
 - 2. Tree stabilization.
 - 3. Aeration.
 - 4. Aggregate surfacing.
 - 5. Landscape edging.

- B. Related Requirements:

- 1. Section 328400 "Underground Irrigation System" for irrigation components and installation.
 - 2. Section 329113 "Planting Soils" for plant soil mix and installation.
 - 3. Section 329113.23 "Structural Soils" for structural soil mix and installation.
 - 4. Section 329200 "Turf and Grasses" for turf (lawn) materials and installation.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- D. Finish Grade: Elevation of finished surface of planting soil.

- E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
- F. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- G. Planting Area: Areas to be planted.
- H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Planting Soils."
- I. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- J. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- K. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- L. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

- A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph.

For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:

1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Weed Control Barrier: 12 by 12 inches.
3. Tree stabilization: One sample of tree anchors.
4. Aggregate Mulch: 5 lb. of each aggregate mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on-site; provide an accurate indication of color, texture, and makeup of the material.
5. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- 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 made according to methods established by the Association of Official Analytical Chemists, where applicable.
- C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.
- D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

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 landscape installation in addition to requirements in Section 014000 "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 all of the following categories from the Professional Landcare Network:
 - a. Landscape Industry Certified Technician - Exterior.
 - b. Landscape Industry Certified Horticultural Technician.
 5. Pesticide Applicator: State licensed, commercial.
- B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
- C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Architect of sources of planting materials seven days in advance of delivery to site.
- 1.10 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 compliance with state and Federal laws if applicable.
- B. 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 materials with appropriate certificates.
- C. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- D. Handle planting stock by root ball.
- E. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees F until planting.
- F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.
- G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 2. Do not remove container-grown stock from containers before time of planting.
 3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.
1. Spring Planting: March 15 to June 1.
 2. Fall Planting: September 1 to November 1.
- C. 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 and warranty requirements.

1.12 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Periods: From date of Substantial Completion.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
 - c. Annuals: Three months.
 - 3. 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 is required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
 - 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.
- E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Annuals and: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery and that are in bud but not yet in bloom.

2.2 FERTILIZERS

- A. Fertilizer: Refer to Section 329113 "Planting Soils."

2.3 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - 1. Type: Double-shredded hardwood.
 - 2. Size Range: 3 inches maximum, 1/2 inch minimum.
 - 3. Color: Natural.

2.4 WEED-CONTROL BARRIERS

- A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

2.5 PESTICIDES

- A. General: Pesticide registered and approved by the 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 Nonselective): 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 Nonselective): Effective for controlling weed growth that has already germinated.

2.6 TREE-STABILIZATION MATERIALS

- A. Basis-of-Design: ArborGuy Tree Anchoring System manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.
 - 1. Model: SASAP08A.
 - a. Verify depth from finished grade to structure prior to installation.

2.7 AERATION

- A. Basis-of-Design: RootRain Aeration Pipe manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.
 - 1. Cap each aeration stand pipe at the surface with RootRain Civic Aeration Inlet manufactured by GreenBlue Urban; Phone (866) 282-2743. Or approved equal.
 - a. Fixed grid inlet with a vandal resistant powder-coated aluminum cap on a retainer chain.

2.8 LANDSCAPE EDGINGS

- A. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
 - 1. Edging Size: 1/8 inch thick by 6 inches deep.
 - 2. Stakes: Tapered steel, a minimum of 12 inches long.
 - 3. Accessories: Standard tapered ends, corners, and splicers.
 - 4. Finish: Zinc coated.

2.9 MISCELLANEOUS PRODUCTS

- A. Burlap: Non-synthetic, biodegradable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
 - 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. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
 3. Suspend planting 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 or which is dusty.
- B. 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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect waterproofing, structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- 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 PLANTING AREA ESTABLISHMENT

- A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Planting Soils."
- B. Placing Planting Soil: Place and mix planting soil according to Section 329113 "Planting Soils."
- C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits.
1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 2. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

5. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 6. Maintain supervision of excavations during working hours.
 7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
- B. Backfill Soil: Subsoil and topsoil removed from excavations [may] [may not] be used as backfill soil unless otherwise indicated.
- C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
1. Backfill: Planting soil per Section 329113 "Planting Soils."
 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
1. Backfill: Planting soil per Section 329113 "Planting Soils."

2. Carefully remove root ball from container without damaging root ball or plant.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE-SPADE PLANTING

- A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.
- C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- D. Cut exposed roots cleanly during transplanting operations.
- E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

- A. Trunk Stabilization by ArborGuy
 1. Install per manufacturer's recommendations.
 2. Use two kits per tree, six anchor wires positioned equally around the rootball with the two straps installed in a 'Star of David' pattern.

3.9 AERATION INSTALLATION

- A. Install aeration system per manufacturer's recommendations and as indicated on the drawings.

3.10 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.
- B. Use planting soil per Section 329113 "Planting Soils" for backfill.
- C. Dig holes large enough to allow spreading of roots.
- D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.11 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees in Turf Areas: Apply organic mulch ring of 2-inch average thickness, with 18-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
 - 2. Organic Mulch in Planting Areas: Apply 2-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.12 EDGING INSTALLATION

- A. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch-deep, shovel-cut edge.
- B. Steel Edging: Standard commercial-steel edging, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
 - 1. Acceptable list of manufacturers, or approved equal:
 - a. Curv-Rite, Inc.
 - b. The J. D. Russell Company
 - c. Permaloc Corporation
 - d. Sure-loc Edging Corporation.
 - 2. Edging Size: 1/8 inch thick by 6 inches deep.
 - 3. Stakes: Tapered steel, a minimum of 12 inches long.
 - 4. Accessories: Standard tapered ends, corners, and splicers.
 - 5. Finish: Zinc coated.

3.13 AGGREGATE SURFACE INSTALLATION

A. Aggregate Surface Installation:

1. Excavate for aggregate surface.
2. Compact subgrade uniformly beneath aggregate surfacing.
3. Apply nonselective, pre-emergent herbicide that inhibits growth of grass and weeds.
4. Install steel edging, delineating the edge of aggregate surfacing. Anchor with steel stakes spaced approximately 36 inches apart, driven below top elevation of edging.
5. Install weed-control barrier before mulching, covering area of aggregate surfacing, and overlapping and pinning edges of barrier at least 6 inches and according to manufacturer's written instructions.
6. Place indicated thickness of aggregate mulch, fully covering weed barrier.
7. Rake mulch to a uniform surface level with adjacent finish grades.

3.14 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
- B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.15 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to 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. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.16 REPAIR AND REPLACEMENT

- A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed pruning and repairs.
 - 2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
 - 3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
 - 1. Provide new plants of same size and species as those being replaced.

3.17 CLEANING AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
- C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. After installation and before project completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.18 MAINTENANCE SERVICE

- A. Maintenance Service for Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
 - 1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION

SECTION 05 5213

PIPE AND TUBE RAILINGS

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. Stainless-steel pipe and tube railings.
- B. Related Requirements:
 - 1. Section 05 5214 "Cable Rail Systems" for cable rail guardrail.

1.3 COORDINATION

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters, including finish.
 - 2. Fittings and brackets.
 - 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of connecting and finishing members at intersections.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

- B. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
- C. Product Test Reports: For pipe and tube railings, for tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
- D. Evaluation Reports: For post-installed anchors, from ICC-ES.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F ,material surfaces.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

1. Provide type of bracket with flange tapped for concealed anchorage to threaded hanger bolt and that provides 1-1/2-inch clearance from inside face of handrail to finished wall surface.

2.3 STAINLESS STEEL

- A. Tubing: ASTM A 554, Grade MT 316L.
- B. Pipe: ASTM A 312/A 312M, Grade TP 316L.
- C. Castings: ASTM A 743/A 743M, Grade CF 8M or CF 3M.
- D. Plate and Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316L.

2.4 FASTENERS

- A. General: Provide the following:
 1. Stainless-Steel Railings: Type 316 stainless-steel fasteners.
 2. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated.
- C. Fasteners for Interconnecting Railing Components:
 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
 2. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to 6 times the load imposed when installed in unit masonry and 4 times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.5 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
 1. For stainless-steel railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

- C. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- J. Form Changes in Direction as Follows:
 - 1. By radius bends of radius indicated.
- K. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

- L. Close exposed ends of railing members with prefabricated end fittings.
- M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

2.7 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Unless otherwise indicated, grind and polish surfaces to produce uniform finish indicated, free of cross scratches.
 - 1. Run grain of directionally textured finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4 finish.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
 - 1. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.

- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.3 ANCHORING POSTS

- A. Anchor posts to concrete pavements with oval flanges, floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.
- B. Cover anchorage joint with flange of same metal as post, welded to post after placing anchoring material.
- C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For stainless-steel pipe railings, weld flanges to post and bolt to supporting surfaces.

3.4 ATTACHING RAILINGS

- A. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and welded to railing ends.

3.5 ADJUSTING AND CLEANING

- A. Clean stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.

3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 5213

SECTION 05 5214**EXTERIOR CABLE RAIL SYSTEMS****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. Extruded stainless steel railing system with cable infill.
- B. Related Requirements:
1. Section 05 213 "Pipe and Tube Railing" for stainless steel handrails.

1.3 REFERENCES

- A. Comply with applicable requirements of following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.
1. American Institute of Steel Construction (AISC):

Code	Code of Standard Practice for Steel Buildings and Bridges
Specification	Specification for the Design, Fabrication and Erection of Structural Steel for Buildings
 2. American Iron and Steel Institute (AISI):

Specifications	Specifications for the Design of Light Gage Cold- Formed Steel Structural Members
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 3. American Society for Testing and Materials (ASTM):

A276	Stainless and Heat-Resisting Steel Bars and Shapes
A492	Stainless and Heat-Resisting Steel Rope Wire
A666	Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
A743	Castings, Iron-Chromium, Iron-Chromium Nickel, and Nickel-Base Corrosion-Resistant, General Application
E894	Anchorage of Permanent Metal Railing Systems and Rails for Buildings
E935	Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings
E985	Specifications for Permanent Metal Railing Systems and Rails for Specifications

4. American Welding Society (AWS):
 - D1.1 Structural Welding Code — Steel
 - D1.2 Structural Welding Code - Aluminum
 - D1.6 Structural Welding Code – Stainless Steel
5. Corps of Engineers (CE):
 - CRD-C-621 Specification for Nonshrink Grout

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For gates. Indicate materials, sizes, styles, and fabrication. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples: For each fence material and for each color specified.
 1. Post, rail and picket: Provide 4 inches in length of each type specified herein.
 2. Cable infill: Provide 8 inches long piece with end fittings.
 3. Aluminum chip with selected paint color for final color verification.

1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturer qualifications.
- B. Welders Certification: Provide certifications, signed by Contractor, certifying that welders employed at project comply with requirements specified under AWS D1.1 and AWS D1.2.
- C. Warranty: Manufacturer's standard warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data:
 1. Manufacturer's recommendation for periodic checking and adjustment of cables to maintain uniform cable tension.
 2. Manufacturer's recommendation for periodic cleaning of cables, railing frames and related components to remove accumulated dirt, debris and stains.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Arrange for installation of ornamental metal specified in this Section by the same firm that fabricated it.

- B. **Manufacturer's Qualifications:** A firm experienced in producing ornamental metal similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Welding:** Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code – Aluminum."
 - 2. AWS D1.6, "Structural Welding Code—Stainless Steel."
- D. **Mockups:** Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Include one complete railing, including infill panel, complying with requirements.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Shop fabricate work to the greatest extent possible. Clearly label pieces in shop to facilitate field assembly.

1.9 WARRANTY

- A. **Special Warranty:** 10-year limited warranty against defects in materials and workmanship.

1.10 MAINTENANCE

- A. **Extra Materials:** Provide one, approximately 0.6 fluid ounce bottle, of touch-up paint per 100 feet of each color railing.

1.11 DELIVERY, STORAGE AND HANDLING

- A. Store work off of the ground and under cover. Protect from damage. Maintain shop applied coatings until installation is complete. Sequence deliveries to avoid delays, but minimize on-site storage.

1.12 PROJECT CONDITIONS

- A. **Field Measurements:** Verify actual locations of walls, steps and other construction contiguous with ornamental metal handrail and fence by field measurements before fabrication and indicate measurements on Shop Drawings.
 - 1. **Established Dimensions:** Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating handrails and fencing without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

1.13 COORDINATION

- A. Coordinate installation of anchorages for ornamental metal items. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS**2.1 STAINLESS STEEL**

- A. Tubing: ASTM A 554, Grade 316L
- B. Pipe: ASTM A 312/A 312M, Grade 316L.
- C. Castings: ASTM A 743/A 743M, Grade CF 8M or CF 3M.
- D. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316L.
- E. Bars and Shapes: ASTM A 276, Type 316L

2.2 ALUMINUM

- A. Aluminum, General: Provide alloys and tempers with not less than the strength and durability properties of alloy and temper designated in paragraphs below for each aluminum form required.
- B. Extrusions: ASTM B 221, Alloy 6063-T5.
- C. Tubing: ASTM B 429/B 429M, Alloy 6063-T6.
- D. Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- E. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.
- F. Castings: ASTM B 26/B 26M, Alloy A356.0-T6.

2.3 FASTENERS

- A. Fastener Materials: Unless otherwise indicated, provide the following:
 - 1. General: Attachment Cable Material: ASTM A 492, Type 316 stainless steel 7x7 (or 7x19) wire rope.
 - a. Stainless-Steel Items: Type 316 stainless-steel fasteners.
 - b. Dissimilar Metals: Type 316 stainless-steel fasteners.
 - 2. Accessories: Provide grommet, bushings, washers, swaging ferrules, studs, receivers, fittings and other components as required for system installation.
- B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.
- C. Provide concealed fasteners for interconnecting components and for attaching ornamental metal items to other work, unless exposed fasteners are unavoidable.
 - 1. Provide tamper-resistant screws for exposed fasteners, unless otherwise indicated.

- D. Anchors: Provide cast-in-place anchors, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E488 conducted by a qualified independent testing agency.

2.4 MISCELLANEOUS MATERIALS

- A. Provide anchors, bolts, sockets, sleeves, and other parts required for securing each item of work to other construction. Furnish inserts and sleeves to be set into concrete formwork.
 - 1. Anchor bolts, bolts smaller than 5/8 in., and fasteners shall be steel castings conforming to ASTM A 307. Bolts larger than 5/8 in. shall conform to ASTM A 325.
- B. Provide exposed fastenings of same material and finish as metal to which applied, unless otherwise noted.
- C. Welding rods: Conform to AWS Standards and recommendations of welding rod manufacturer.
- D. Grout for Exterior Applications: Provide Factory-packaged, non-shrink, non-staining, hydraulic controlled expansion cement formulation for mixing with water at project site. Provide formulation that is resistant to erosion from water exposure without need for protection by a sealer or waterproof coating. Provide Super Por-Rok, Erosion-Resistant Anchoring Cement, manufactured by Minwax Construction Products Division, or equal as approved by Architect.
- E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.5 FABRICATION, GENERAL

- A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. Fabricate work to be truly straight, plumb, level and square and to sizes, shapes, and profiles indicated on approved shop drawings. Ease exposed edges. Cut, reinforce, drill and tap metalwork as necessary for proper assembly and use.
 - 1. Fabricate all miscellaneous metal supports, brackets, braces and the like required to fully complete the work of this Section.
 - 2. Coordinate with work of other Specification Sections to ensure proper interface of various parts of the work.
 - 3. Obtain loading requirements from suppliers of work to be supported and design and fabricate support systems with factor of safety of at least 6.
- B. Form ornamental metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris. Take special care in choosing materials that are smooth and free of blemishes such as pits, roller marks, trade names, scale and roughness. Fabricate work with uniform, hairline tight joints. Form welded joints and seams continuously and grind flush and smooth to be invisible after painting. For exposed fasteners, use hex head bolts or Phillips head machine screws.

- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.
- E. Provide weep holes where water may accumulate.
- F. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items, unless otherwise indicated.
- G. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.
- H. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.7 STAINLESS STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Unless otherwise indicated, grind and polish surfaces to produce uniform finish indicated, free of cross scratches.
 - 1. Run grain of directionally textured finishes with long dimension of each piece.
- C. Directional Satin Finish: No. 4 finish.

2.8 ALUMINUM FINISHES

- A. Baked-Enamel or Powder-Coat Finish: AAMA 2604 except with a minimum dry film thickness of 2 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Color and Gloss: As selected by architect from manufacturer's full color range.

2.9 ELECTROLYTIC SEPARATION / CORROSION RESISTANCE

- A. Coating for electrolytic separation between steel and concrete and grout shall be a high-build coal tar epoxy providing one coat protection for steel and concrete in a variety of chemical, immersion and underground conditions, manufactured by Tnemec Company, Inc., 6800 Corporate drive, Kansas City, MO 64120-1372; Tel. 816-483-3400; Kop-Coat Inc, 436 Seventh

Avenue, Pittsburgh, PA 15219-1818; 1/412/227-2700, parent company RPM, International 2628 Pearl Road - P.O. Box 777 - Medina, Ohio 44258; Phone: 330.273.5090 - Fax: 330.225.8743; Carboline Company, 2150 Schuetz Road, St. Louis, MO 63146; Phone: 800-848-4645 or 314-644-1000; FAX: 314-644-4617, or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, construction layout, and other conditions affecting performance of the Work.
- B. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Stake locations of fence lines, gates, and terminal posts. Indicate locations of utilities, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

- A. Install railing system according to manufacturer's written instructions and approved shop drawings.
 - 1. Provide anchorage devices and fittings to secure to in-place construction; including threaded fittings for concrete inserts, toggle bolts and through-bolts. Install mesh panel infill system plumb, level, square, and taut.
 - 2. Anchor railing system to mounting surfaces as indicated on the drawings.
 - 3. Separate dissimilar materials with bushings, grommets or washers to prevent electrolytic corrosion.
 - 4. Use manufacturer's supplied mounting hardware.
 - 5. Terminate and tension mesh panels in accordance with manufacturer's instructions.
 - 6. Ensure mesh is clean, and without waves, kinks, or sags.
 - 7. Adjust frame support cable tension and connecting hardware.
- B. Perform cutting, drilling, and fitting required to install ornamental metal handrails and guardrails. Set products accurately in location, alignment, and elevation; measured from established lines and levels. Provide temporary bracing or anchors in formwork for items to be built into concrete, masonry, or similar construction.
- C. Fit exposed connections accurately together to form tight, hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding, and grinding are required for proper shop fitting and jointing of ornamental metal, restore finishes to eliminate evidence of such corrective work.

- D. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.
- E. Restore protective coverings that have been damaged during shipment or installation. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at same location.
 - 1. Retain protective coverings intact; remove coverings simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.
- F. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal arc welding, for appearance and quality of welds, and for methods used in correcting welding work. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent surfaces.
- G. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.4 ATTACHMENT OF STAINLESS STEEL GUARDRAIL

- A. Guardrail components shall be installed where indicated. Splices, where required, shall be made at expansion joints. Removable sections shall be installed as indicated.
 - 1. Guardrails shall be installed as specified and shown. Stanchion shall be welded to base plate and bolted to wall caps.
 - 2. Guardrail ends shall be secured as indicated on the Drawings.

3.5 TOLERANCES

- A. The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Document and shall not be added to allowable tolerances indicated for other work.
 - 1. Allowable Variation from True Plumb: $\pm 1/8$ in. in 20 ft. - 0 in.
 - 2. Allowable Variation from True Level: $\pm 1/8$ in. in 20 ft. - 0 in.
 - 3. Allowable Variation from True Line: $\pm 1/8$ in. in 20 ft. - 0 in.

3.6 INSPECTION AND ACCEPTANCE PROVISIONS

- A. Finished Ornamental Metal Work Requirements: Ornamental metal work will be rejected for any of the following deficiencies:
 - 1. Finish of exposed-to-view aluminum and stainless steel surfaces having color and appearance that are outside the color and appearance range of the approved samples for aluminum and stainless steel finish.
 - 2. Installed ornamental metal items having stained, discolored, abraded, or otherwise damaged exposed-to-view surfaces that cannot be removed by cleaning or repairing.
 - 3. Installed ornamental metal items that do not match the approved sample.

4. Aluminum and stainless steel surfaces in contact with dissimilar materials that are not protected as specified.

3.7 CLEANING

- A. Aluminum and stainless steel manufacturer's recommended cleaning materials and application methods including precautions in the use of cleaning materials that may be detrimental to the aluminum or stainless steel finish when improperly applied.

3.8 PROTECTION

- A. Protect finishes of ornamental metal from damage during construction period with temporary protective coverings approved by ornamental metal fabricator. Remove protective covering at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

END OF SECTION 05 5214

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SECTION 07 1000

WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Horizontal waterproofing at split slab to receive topping slab.
 - 2. Horizontal and vertical waterproofing for use at concrete pits

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide waterproofing that prevents the passage of liquid water under hydrostatic pressure and complies with requirements as demonstrated by testing performed by an independent testing agency of manufacturer's current sheet membrane.

1.3 SYSTEM DESCRIPTION

- A. Furnish and install a completed horizontal waterproofing system capable of supporting a split slab concrete topping slab and/or pavers. System shall include surface conditioner, monolithic membrane, membrane terminations, and drainage protection course ready for installation of concrete topping or pavers.
- B. Furnish and install a completed vertical and horizontal waterproofing assembly including surface conditioner, monolithic membrane and related flashings, protection course, and insulation for concrete pits exposed to garage levels.

1.4 REFERENCES

- A. Work specified herein shall conform to applicable portions of the following referenced standards.
 - 1. American society for Testing and Materials (ASTM):
 - a. ASTM D 4263: Concrete Moisture Test
 - b. ASTM D 4491: Standard Test Method for Water Permeability of Geotextiles by Permittivity.
 - c. ASTM D 4632: Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - d. ASTM D 4751: Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - e. ASTM D 4833: Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products.

1.5 SUBMITTALS

- A. Product Data:
 - 1. For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
 - a. Manufacturer's installation procedures.
- B. Shop Drawings:
 - 1. Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.
 - 2. Letter of applicator approval from manufacturer per requirements specified in Quality Assurance herein.
- C. Sample Warranties:
- D. Installer certificates:
 - 1. signed by manufacturer certifying that Installers comply with requirements under the "Quality Assurance" Article.
- E. Product test reports:
 - 1. From a qualified independent testing agency evidencing compliance of waterproofing with requirements and other physical properties reported by manufacturer based on comprehensive testing of products according to current standard test methods within previous 5 years.

1.6 QUALITY ASSURANCE

- A. Installer: Firm with not less than 3 years of successful experience in installation of waterproofing sheets similar to requirements for this project and which is acceptable to or licensed by manufacturer of primary waterproofing materials.
- B. Membrane applicator's lead personnel, (field superintendent and foreman), in charge of the work shall each have the following experience:
 - 1. Three (3) verifiable years of experience supervising the application of the membrane system being provided on this product.
 - 2. Successfully installed three (3) membrane projects of similar size, type and using the same membrane system being provided on this project.
 - 3. Membrane applicator's lead personnel shall be present for all field operation pertaining to this waterproofing system installed.
- C. Preinstallation Conference: Conduct conference at Project Site.
 - 1. Review waterproofing requirements, including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

D. Testing:

1. The Owner may perform tests to ensure compliance with the Contract Documents and manufacturer's requirements.
2. If tests reveal noncompliance, correct deficiencies in a manner approved by the Owner and the manufacturer at no additional cost to the Owner.
3. Except as otherwise specified, the Owner will pay the costs of the tests, including repair and patching of test areas.
4. Where tests reveal deficiencies in the membrane materials or installation, the costs of the tests, and repair and patching of the test areas shall be borne by the Contractor.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery of materials: Deliver materials in manufacturer's original unopened containers with manufacturer's brand name clearly marked thereon.
- B. Store containers as directed by manufacturer. Maintain temperature required by manufacturer.

1.8 PROJECT CONDITIONS

- A. Comply with recommendations of manufacturer for temperature and humidity ranges during which to apply materials, and to be maintained for period of time after application.

1.9 WARRANTY

- A. Provide manufacturer's 20-year water tightness warranty indicating that the product and installation will remain watertight for the duration of the warranty period.
- B. Warranties: Include coverage of waterproofing failure to resist penetrations of water, except where such failures are result of structural failures of building resulting in conditions beyond those covered by warranties. Hairline cracking of concrete due to temperature change or shrinkage is not considered as structural failure.
- C. Be responsible for removal and replacement of materials concealing waterproofing, to their condition at start of removal and replacement.

PART 2 - PRODUCTS**2.1 REINFORCED WATERPROOFING MEMBRANE**

- A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.
 1. Basis of Design: American Hydrotech, Inc; Monolithic Membrane 6125 with "Flex-Flash F" reinforcement between layers.
- B. Manufacturers and products listed in this Section 07 1000 are specified standards, intended to further define the design and performance intent of Contract Documents. Equivalent products by

the following manufacturers subject to compliance with requirements specified herein shall be acceptable:

1. Carlisle Coatings & Waterproofing Inc; CCW-500R.
2. Henry Company; 790-11.
3. Tremco Incorporated; Tremproof 150HRA.

2.2 AUXILIARY MATERIALS

- A. Surface Conditioner:
 1. Manufacturers recommended Asphaltic surface conditioner for concrete surfaces.
- B. Flashing:
 1. Manufacturers recommended 60-mil (1.5 mm) thick, uncured neoprene flashing/(heavy duty) reinforcing sheet.
- C. Reinforcing Fabric:
 1. Manufacturer's recommended, spun-bonded polyester fabric.
- D. Sealants and Accessories: Manufacturer's recommended sealants and accessories.
- E. Protection Course: Manufacturer's standard, 90-mil thick, fiberglass-reinforced rubberized asphalt or modified bituminous sheet.
- F. Liquid waterproofing for coves at horizontal-to-vertical corners and where required by manufacturer: As recommended by waterproofing manufacturer.
- G. Drainage Protection Course:
 1. Manufacturers recommended composite drainage system consisting of a three-dimensional, crush-proof, drainage core and a filter fabric.
 - a. Basis of Design: Hydrodrain 990

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Before surface preparation, examine the substrates for cracks and joints. Note the location of cracks greater than 1/16 inch wide. After surface preparation, detail the noted cracks, construction and control joints in accordance with Article 3.3.
 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 2. Verify prior to each installation that the substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

3.2 PREPARATION

- A. General requirements:

1. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.
2. Remove grease, oil, form release agents, paints, and other penetrating contaminants from concrete.
3. Prepare, fill, prime, and treat joints and cracks in substrate. Remove dust and dirt from joints and cracks according to ASTM D 4258.
4. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids. If necessary for good adhesion, grind off or roughen existing surface, as may be necessary to bring surface to condition recommended by manufacturer.
5. Follow manufacturer's minimum temperature recommendations for installation. Do not apply waterproofing in wet weather or on damp concrete surfaces. Surface must be free of frost.
6. Mask off adjoining surfaces not receiving waterproofing to prevent spillage affecting other construction.

3.3 INSTALLATION

A. Detail Applications:

1. Surface conditioner application:
 - a. Apply the surface conditioner to the concrete per manufacturers recommendations
 - b. Allow sufficient time for the surface conditioner to thoroughly dry prior to the membrane application.
2. After surface preparation, detail the cracks, construction and control joints in accordance with manufacturers standard details.
 - a. Install membrane strip and center over construction and control joints and cracks exceeding a width of 1/16 inch.
 - b. Inside Corners: Prepare, prime, and treat inside corners according to waterproofing manufacturer's written instructions.
 - 1) Install membrane strip centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
 - a) At deck-to-wall intersections, extend liquid membrane or sheet membrane flashing onto deck waterproofing and to finished height of sheet flashing.
 - c. Outside Corners: Prepare and treat outside corners according to waterproofing manufacturer's written instructions.
 - 1) Install strip of membrane 12 inches wide, centered over corner.
 - d. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to waterproofing manufacturer's written instructions.
 - e. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge and cover with sheet membrane strips.
3. In areas of elevated moisture content, provide a minimum 90 dry mil membrane detail coat and continuous reinforcement sheet as required by the membrane manufacturer.
4. Provide a minimum 90 dry mil membrane detail coat and reinforcement sheet at interior and exterior corners and other changes in the substrate direction.

5. Provide a minimum 90 dry mil membrane coat and uncured neoprene flashing sheet around drains and other slab penetrations at interior corners where slabs meet perimeter retaining walls, and at metal angles at expansion joints.
- B. Reinforced membrane waterproofing:
1. Heat and apply the membrane in accordance with the manufacturer's instructions. Use materials and application techniques to prevent pin holing and blistering.
 2. unless indicated otherwise on Drawings: Terminate membrane on vertical surfaces 1 inch below the top of finished surfaces or grade which will be installed after Work of this Section.
 3. Mask vertical surfaces as required to protect the adjacent surface finishes.
 4. Apply manufacturer's standard surface conditioner to prepared surface.
 5. Roll first coat of waterproofing onto surface conditioner to minimum uniform thickness of 60 mils in addition to previously installed detail coats.
 6. Apply reinforcement membrane onto first coat of waterproofing.
 7. Roll second coat of waterproofing onto reinforcement membrane to minimum uniform thickness of 125 mils for a total membrane thickness of 215 mils.
 8. Ensure total coverage at corners and intersections with existing waterproofing.
 9. Carefully inspect waterproofing prior to covering. Reapply if necessary to ensure full continuity of waterproofing.
- C. Protection course:
1. Provide protection board on the membrane in compliance with the membrane manufacturer's recommendations.
 2. Install pieces in as large of size as possible.
 3. Ensure the protection board lays flat and in full contact with the membrane.
 4. Do not permit waterproofing to remain exposed to use by other trades without protection board.
- D. Drainage board:
1. Install drainage board on all horizontal and near horizontal sloped surfaces of completed membrane system in accordance with the manufacturer's recommendations.
 2. Install pieces in as large of size as possible. Overlap ends of separate pieces as appropriate based on the configuration of the drainage board. Install drainage board in shingle fashion with the direction of the slope. Cut away 2 to 3 inches of drainage board without cutting filter fabric adhered to board at all board intersections end terminations to allow for an overlap or turnup of the filter fabric. Spot adhere filter fabric to turn ups to hold down in place during construction.
 3. Cut away drainage board without cutting filter fabric adhered to board at all new drain openings. Spot adhere an extra piece of filter fabric at all drain openings.
 4. Ensure the drainage board lays flat and in full contact with the membrane.
 5. Refer to details on drawings for specifics regarding drainage board installations. Review special cases and situations with Architect.

3.4 FIELD QUALITY CONTROL

- A. Testing of waterproofing on horizontal surfaces:
1. At completion of waterproofing and protection board installation on horizontal surfaces test entire installation specified herein in the presence of Construction Manager, Architect and a representative of waterproofing manufacturer.
 2. Prior to installation of drainage board, water test membrane by ponding a minimum of 2-inches for a period of 24 hours to ensure a watertight system. Build dams on sloped surfaces as required to pond water.
 3. Provide means of water containment during water testing to prevent flooding of adjoining areas and areas below planters.
 4. Verify that the structure can support the deadload weight of the water prior to testing.
 5. Construct water containment barriers as approved by the membrane manufacturer.
 6. Examine spaces below waterproofing for leakage and, if leakage is found, adjust waterproofing as necessary using factory approved methods only, and retest as specified above. Repeat this procedure as necessary until waterproofing installation is approved by Architect and a representative of waterproofing manufacturer as watertight.
 7. Water tests can be waived jointly by the Architect, Construction Manager, and the Manufacturer, only after the Contractor has demonstrated the ability to provide successful system installation in previous application areas.
- B. Manufacturer's field service:
1. A technically competent employee of the waterproofing membrane manufacturer, not associated with the Contractor, installation crew, product distributor or sales representative shall be on site before first installation of the membrane system.
 2. Technical representative shall be on site for length of time necessary to observe the preparation and installation of adequate square feet of waterproofing membrane system, including drainage board.
 3. Do not begin application until the technician has approved the preparation, cleanliness and surface texture of the substrate.
 4. The technician shall review all Contractor application techniques and procedures and shall advise the Contractor when, where and as required to obtain specification compliance.

3.5 INSULATION INSTALLATION

- A. Install one or more layers of board insulation to achieve required thickness over waterproofed surfaces. Cut and fit to within 3/4 inch of projections and penetrations.
1. Install pieces in as large of size as possible and not less than ten (10) square feet in size.
 2. Ensure the protection board lays flat and in full contact with the membrane.
 3. Do not permit waterproofing to remain exposed to use by other trades without protection board.
 4. Install with joints tight and end joints staggered.
 5. Mechanically fasten layers together using insulation manufacturer's approved system, to prevent separation of insulation joints

3.6 ADJUSTMENT

- A. Replace any areas showing defects or damage
- B. Protect waterproofing from damage and wear during application and remainder of construction period, according to manufacturer's written instructions
- C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction

END OF SECTION

SECTION 07 9500
EXPANSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Architectural joint systems for building exterior.

1.2 SUBMITTALS

- A. Submit items indicated below for review by Architect:
1. Shop drawings:
 - a. Submit sets indicating materials, arrangement, profiles, thickness, assembly and installation details, finishing, fastenings, supports and coordination with other trades.
 - b. Provide interface details of horizontal and vertical joints.
 2. Product data:
 - a. For each type of expansion joint cover assembly specified indicating compliance with specified requirements. Include manufacturer's product specifications, installation instructions, details of construction relative to materials, dimensions of individual components, profiles, and finishes.
 3. Samples for initial selection:
 - a. Submit manufacturer's color charts, actual units, or sections of units showing full range of colors, textures, and patterns available for each exposed metal and elastomeric material of expansion joint cover assembly indicated.
 4. Samples for verification:
 - a. Submit full-size units of each type of expansion joint cover assembly indicated; in sets for each finish, color, texture, and pattern specified, showing full range of variations expected in these characteristics.

1.3 QUALITY ASSURANCE

- A. Installer qualifications: Demonstrate competency equal to minimum ten years' experience in installing products similar to those specified herein.
1. Comply with manufacturer's product specifications, installation instructions, and general recommendations for each type of expansion joint cover system indicated.
 2. Systems to be installed by qualified sub-contractors only according to detailed published installation procedures and/or in accordance with job-specific installation instructions of manufacturer's field technician.
- B. Single-Source Responsibility: Obtain each type of expansion joint cover assemblies specified in this Section from one source from a single manufacturer. Coordinate compatibility with expansion joint cover assemblies specified in other sections.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Site in manufacturer's original packages, where packaged, with seals unbroken, and manufacturer's name and contents marked thereon.
- B. Storage of materials: Store at Site in a manner to prevent damage or deterioration and in accord with temperature, moisture, ventilation and other requirements of the manufacturer.

1.5 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Installer's Warranty: Written warranty, signed by Installer agreeing to repair or replace expansion joints 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 expansion joints from the following:
 - 1. Excessive movement of the structure resulting in stresses on the expansion joints exceeding manufacturer's written specifications for expansion and compression caused by structural settlement or errors attributable to design or construction.
 - 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS**2.1 SYSTEM DESCRIPTION**

- A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
 - 2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.
- B. Joint Seal Color: As selected by Architect from manufacturer's full range of industry colors.

2.2 ARCHITECTURAL JOINT SYSTEM - EXTERIOR:**A. Watertight Split Slab/Plaza-Deck Expansion Joint System:**

1. Basis of Design: DSM-FP as manufactured by EMSEAL JOINT SYSTEMS LTD and as indicated on drawings for horizontal expansion joint locations.
 - a. Alternate manufacturers must demonstrate that their products meet or exceed the design criteria.
2. Sealant system shall be comprised of two subassemblies:
 - a. the joint sealing assembly and
 - b. the structural-slab mounted supporting legs with integral waterproofing side sheets.
 - c. The two subassemblies shall be comprised of the following components:
 - 1) cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;
 - 2) field-applied epoxy adhesive primer,
 - 3) field-injected silicone sealant bands,
 - 4) structural-slab mounted retainer legs,
 - 5) integral heat weldable NBR modified PVC waterproofing side sheets,
 - 6) stainless steel capping strips,
 - 7) hi-mod epoxy-gel leveling bed and dielectric separator layer,
 - 8) carbon Steel Grade II zinc dichromate yellow finish, UNC 16, anchors and nuts and, and
 - 9) hi-mod anchor epoxy
3. Material shall be capable of movements of +50%, -50% (100% total) of nominal material size. Standard sizes from 1-inch to 4inches. Depth of seal as recommended by manufacturer.
4. Silicone coating to be highway-grade, low-modulus, jet-fuel resistant silicone factory-applied to the foam while it is partially pre-compressed to a width greater than maximum joint extension and cured before final compression. When compressed to final supplied dimension, a bellow(s) to handle movement must be created in the silicone coating.
5. Epoxy-mortar setting/leveling bed to act as dielectric separator as well as to ensure that the system is fully supported and at the appropriate elevation throughout its length.
6. Manufacturer's field-applied epoxy gel adhesive is applied to the faces of the previously installed mounting leg assembly. DSM-FP foam seal is lowered into the adhesive slightly recessed from the surface. Field-injected silicone sealant bands shall be injected at the bellow to leg assembly interface to complete the waterproofing.
7. The side flashing sheets shall be 12-inch wide and 0.012-inch thick.
8. Side flashing sheets are locked into a reglet in top surface of retainer leg on each side of joint. With the side flashing sheets pulled out of the way deck waterproofing membrane (by others) is installed on the deck and brought over and up the DSM-FP system retainer legs. The side flashing sheets are lowered into the liquid membrane (or into the non-sag mastic component of a sheet waterproofing system by others) and sandwiched with another layer of waterproofing. Paver, asphalt or wearing course material is installed up to the stainless steel retaining caps on the mounting rails. Concrete as a wear course is poured up to a 1/4-inch form strip (by others) placed against the stainless steel retainer

caps. After the concrete has cured, the form strip is removed and the control joint caulked with a liquid sealant (by others).

B. Preformed, Pre-Compressed, Self-Expanding, Sealant System:

1. Basis of Design: DSM- as manufactured by EMSEAL JOINT SYSTEMS LTD and as indicated on drawings for horizontal expansion joint locations.
2. Sealant system shall be comprised of three components:
 - a. cellular polyurethane foam impregnated with hydrophobic 100% acrylic, water-based emulsion, factory coated with highway-grade, fuel resistant silicone;
 - b. field-applied epoxy adhesive primer,
 - c. field-injected silicone sealant bands.
3. Material shall be capable of movements of +50%, -50% (100% total) of nominal material size. Standard sizes from 1/2-inch to 4-inches. Depth of seal as recommended by manufacturer.
4. Silicone coating to be highway-grade, low-modulus, jet-fuel resistant silicone applied to the impregnated foam sealant at a width greater than maximum allowable joint extension and which when cured and compressed will form a bellows.
5. DSM to be installed into manufacturer's standard field-applied epoxy adhesive.
6. DSM is to be installed slightly recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and the foam-and-silicone-bellows, the system will be essentially flush with the substrate surface.
7. Select the sealant system model appropriate to the movement and design requirements at each joint location that meet the project specification or as defined by the structural engineer of record

C. Preformed, Pre-Compressed, Self-Expanding, Fire Rated Sealant System:

1. Basis of Design: EMSHIELD DFR as manufactured by EMSEAL JOINT SYSTEMS LTD and as indicated on drawings for horizontal-plane expansion joint locations.
 - a. Rating: 3-hr horizontal, 2-hr vertical.
2. Sealant system shall be comprised of the following components:
 - a. fire-retardant-impregnated foam,
 - b. pre-coated on the traffic surface with highway-grade, fuel resistant silicone,
 - c. precoated on the bottom side with a silicone bellows,
 - d. field-applied epoxy adhesive primer,
 - e. field-injected silicone sealant bands.
3. Material shall be capable of movements of up to +25%, -25% (100% total) of nominal material size. Standard sizes from 1/2-inch to 4-inches. Depth of seal is 4-inches.
4. Silicone coating to be highway-grade, low-modulus, jet-fuel resistant silicone factory-applied to the foam while it is partially pre-compressed to a width greater than maximum joint extension and cured before final compression. When compressed to final supplied dimension, a bellow(s) to handle movement must be created in the silicone coating.
5. EMSHIELD DFR to be installed into manufacturer's standard field-applied epoxy adhesive. EMSHIELD DFR is to be installed slightly recessed from the surface such that when the field-applied injection band of silicone is installed between the substrates and

the foam-and-silicone-bellow(s), the system will be essentially flush with the substrate surface.

6. Select the sealant system model appropriate to the movement and design requirements at each joint location that meet the project specification or as defined by the structural engineer of record

D. Thermoplastic Rubber Joint Seal System:

1. Basis of Design: Wabo®Crete Membrane - ME, Series seal element as manufactured by Watson Bowman Acme Corp.
2. General:
 - a. Provide watertight expansion control system that is capable of accommodating multi-directional movement. System shall consist of preformed thermoplastic rubber profiles with integral side flanges typically cast into a preformed blockout by means of utilizing manufacturer's ambient cure elastomeric header.
 - b. The thermoplastic rubber seal element shall be sized to accommodate the total range of movement as dictated by the specifier at each joint location. Sizing shall be made in such a way as to ensure that the elastomeric membrane seal will remain under a degree of compression throughout the full movement cycle. Where required, provide seal that accepts pedestrian traffic. The contractor will provide evidence utilizing manufacturer's product data that the membrane seal will comply with this requirement
 - c. Finishes:
 - 1) Thermoplastic Rubber Membrane Seal shall be supplied in standard color: Black.
 - 2) Elastomeric Header material shall be selected from manufacturer's full range of standard and custom colors.
3. Thermoplastic Rubber Joint Seals: Provide seal profile as specified and indicated in the contract drawings. Profile design shall incorporate integral side flanges exhibiting a pronounced serrated profile and factory punched holes that interlocks the profile into the elastomeric header material. Material shall meet the physical and performance properties indicated below.

<u>PHYSICAL PROPERTIES</u>	<u>ASTM TEST METHOD</u>	<u>REQUIREMENT</u>
Shore A Hardness	D-2240	67 ± 3
Tensile Strength, min	D-412	850 psi
Ultimate Elongation, min	D-412	300%
100% Modulus	D-412	435 psi
Tension set, average	D-412	10%
Tear strength, average	D-624	140 pli @ 73°F 58 pli @ 212°F
Compression Set, average, 168 hours	D-395	23% @ 73°F
Brittle point, average	D-746	< -76°F

<u>PERFORMANCE PROPERTIES</u>	<u>TEST METHOD</u>	<u>REQUIREMENT</u>
Ozone Resistance	ASTM D-1171	No Cracks
UV Resistance	SAE J1960	Pass
Staining Resistance	ASTM D-925	No Staining
Fatigue Resistance	ASTM D-1052	2 Million Cycles

4. Elastomeric Header: Material shall be an ambient cure, 100% solids, two component polyurethane with pre-graded aggregate mix exhibiting the physical properties listed in the tables below. When properly mixed and poured, the elastomeric concrete cures rapidly, flows and fills any voids, spalls or irregularities forming a monolithic unit.

- a. Material shall meet the physical and performance properties indicated below:

<u>PHYSICAL PROPERTIES</u>	<u>ASTM TEST METHOD</u>	<u>REQUIREMENT</u>
Tensile Strength, min	D-638	750 psi
Ultimate Elongation, min	D-638	150%
Hardness, Shore D	D-2240	40 +/- 10
Compression Set, 22 hr at 158°F, max	D-395, Method B	50%
Tear Resistance, min	D-624	80 pli
Water Absorption, max	D-570	3%
Heat Shrinkage	D-1299	1.6%

- b. Elastomeric cured binder and aggregate shall meet the following physical properties:

<u>PHYSICAL PROPERTIES</u>	<u>ASTM TEST METHOD</u>	<u>REQUIREMENT</u>
Compressive Strength, min	D-695	2,200 psi
Resilience at 5% deflection, min	D-695	90%
Slant Shear Bond Strength, min	N/A	250 psi
Impact Resistance		
at 32°F (0°C)	N/A	No Cracks
at -20°F (-29°C)		No Cracks
at 158°F (70°C)		No Cracks

5. Bonding Agent:

- a. Provide manufacturer's two component, 100 percent solids bonding agent and apply to the sides and base of the preformed blockouts prior to placement of Wabo®Crete II elastomeric header. Store, mix and apply in accordance with manufacturer's system data sheet.
- b. Liquid components shall be identified by the following information:
- 1) Part A - Resin; Color: Clear.
 - 2) Part b - Activator; Color: Selected from manufacturer's full range.

6. Accessories:

- a. Provide necessary and related parts including preformed or fabricated Wall Mount Plates with appropriate anchors and sealants where required for complete installation.

2.3 FABRICATION

- A. Watertight Split Slab/Plaza-Deck Expansion Joint System:

1. DSM-FP by EMSEAL must be supplied precompressed to less than the joint size, packaged in shrink-wrapped lengths (sticks).
2. For the mounting rail and side sheet assembly, directional changes and terminations into vertical plane surfaces (walls, parapets, ends of decks, etc) as well as to transition the material through curbs, treads and risers or other in-slab plane changes to be provided by

factory-manufactured assemblies to field measurements provided by the expansion joint subcontractor.

3. Expansion joint supporting aluminum rail extrusions to be factory set at mid-point of movement range and held at this dimension by spacers to be removed after attachment of the rails to the deck. Furnish in lengths to minimize number of end joins
- B. Preformed, Pre-Compressed, Self-Expanding, Sealant Systems:
1. DSM and EMSEAL DFR must be supplied precompressed to less than the joint size, packaged in shrink-wrapped lengths (sticks).
 2. Directional changes and terminations into horizontal plane surfaces to be provided by factory-manufactured universal-90-degree single units containing minimum 12-inch long leg and 6-inch long leg or custom leg on each side of the direction change or through field fabrication in strict accordance with installation instructions.
- C. Thermoplastic Rubber Joint Seal System:
1. Thermoplastic Rubber Membrane Seal - Ship in the longest practical continuous length in manufacturer's standard shipping carton or on wooden pallets shrink wrapped.
 2. Joint Seal Directional Changes - At all horizontal changes in direction provide seals with factory heat welded splices such as 90° corners, tees and crosses. The seal shall extend a minimum of 2'-0" in each direction from the factory splice.
 3. Only straight, butt splice connections shall be allowed on the jobsite following manufacturers written instructions utilizing specialty heat fusing equipment or the manufacturer specialty-splicing adhesive.
 4. All factory and field fused connections shall incorporate bonding of the complete seal profile. This includes fusing of all internal and external web configurations.
 5. Elastomeric Header - Activator packaged in one-half gallon containers (Part A), resin packaged in gallon containers (Part B) and 60 pound containers of aggregate (Part C) on shipped wooden pallets, shrink wrapped.

2.4 METAL FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes to products in factory after fabrication. Protect finishes on exposed surfaces before shipment.
- B. Finish on exposed aluminum at Type B Expansion Joint Cover Class 1 anodized finish per AA-M12C22 complying with AAMA 607.1 for clear anodized or 606.1 or 608.1 for integrally colored. Mechanical Finish: as fabricated, nonspecular; Chemical Finish: etched, medium matte; Anodic Coating: Class I Architectural, clear film or integrally colored coating 0.018 mm or thicker.
1. Color as selected by Architect from manufacturer's full range of standard and custom colors.
- C. Exposed fasteners and other accessories shall have matching finish.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Manufacturer's Instructions: In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for phases of Work, including preparing substrate, applying materials, and protecting installed units.
- B. The contractor shall provide properly formed and prepared expansion joint openings constructed to the exact dimensions and elevations shown on manufacturer's standard system drawings or as shown on the contract drawings
- C. The contractor shall clean the joint opening of all contaminants immediately prior to installation of expansion joint system. Repair spalled, irregular or unsound joint surfaces using accepted industry practices for repair of the substrates in question. Remove protruding roughness to ensure joint sides are smooth. Ensure that there is sufficient depth to receive the full depth of the size of system being installed. Refer to Manufacturers Installation Guide for detailed step-by-step instructions

3.3 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.
 - 2. The contractor shall provide a properly formed, solid concrete blockout per the manufacturer and project requirements
 - 3. Cutting, Fitting, and Placement: Perform minimum cutting, drilling, and fitting required to install expansion joint covers. Install joint cover assemblies in true alignment and proper relationship to expansion joints and adjoining finished surfaces measured from established lines and levels. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling. Set floor covers at elevations to be flush with adjacent finished floor materials. Locate wall, ceiling, roof, and soffit covers in continuous contact with adjacent surfaces. Securely attach in place with required accessories. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches on center.
 - 4. Continuity: Maintain continuity of expansion joint cover assemblies with a minimum number of end joints and align metal members mechanically using splice joints. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials (if any) to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.

5. Where field modification is required for proper fitting and jointing, restore finishes to eliminate any evidence of such corrective work.
 6. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.
 7. Restore protective coverings which have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
 8. Ensure watertight installation.
 9. At fire barrier systems, install in strict conformance with requirements of manufacturer's approved fire tested and approved assembly so that fire-rated construction is continuous
- B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion control systems.
1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper expansion control system installation and performance.
 3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.
 4. Repair or grout blockout as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
 5. Install frames in continuous contact with adjacent surfaces.
 - a. Shimming is not permitted.
 6. Locate anchors at interval recommended by manufacturer, but not less than 3-inches from each end and not more than 24-inches o.c.
- C. Seals in Metal Frames: Install elastomeric seals and membranes in frames to comply with manufacturer's written instructions. Install with minimum number of end joints.
1. Provide in continuous lengths for straight sections.
 2. Seal transitions according to manufacturer's written instructions. Vulcanize or heat-weld field-spliced joints as recommended by manufacturer.
 3. Installation: Mechanically lock seals into frames or adhere to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- D. Compression Seals: Apply adhesive or lubricant adhesive as recommended by manufacturer to all surfaces before installing compression seals.
- E. Elastomeric/Foam Seals: Install with adhesive recommended by manufacturer.
1. Select proper size material for joint width, as recommended by manufacturer.
 2. Cut 45 degree miter where material is to be joined. Vulcanize or heat-weld field splice joints in preformed seal material to provide watertight joints using procedures recommended by manufacturer.
 3. Ensure flush installation with adjacent surfaces.

4. Seal end joints within continuous runs and joints at transitions according to manufacturer's directions.
 5. Seal transitions according to manufacturer's instructions.
- F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion control system materials and associated work so complete assemblies comply with assembly performance requirements.
1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.
- G. Moisture Barrier: Provide at all exterior joints and where indicated on Drawings. Provide drainage fittings at a maximum of 50-feet or where indicated on Drawings.
- H. Seismic Seals: Install interior seals in continual lengths; vulcanize or heat-weld field splice joints in interior seal material to provide watertight joints using manufacturer's recommended procedures. Install exterior seal in standard lengths. Seal transitions and end joints per manufacturer's instructions.

3.4 CLEANING AND ADJUSTMENT

- A. Restore work damaged during installation and construction period so that no evidence remains of correction work. Return items to shop that cannot be corrected in field as approved by Construction Manager; make required alterations and refinish entire unit or provide new units.
- B. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's instructions; leave in condition acceptable to Architect.

END OF SECTION

SECTION 32 1313
CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following:
 - 1. Driveways and roadways.
 - 2. Parking lots.
 - 3. Curbs and gutters.
 - 4. Walkways.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
 - 2. Division 31 Section "Earth Moving" for subgrade preparation, grading, and subbase course.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
 - 1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Admixtures.

3. Curing compounds.
4. Applied finish materials.

D. Jointing Plan

E. For Sidewalks with Sand Blast Finish

1. Product Data: Submit manufacturers' product data for manufactured products
2. Samples: Review by the Engineer will be for color and texture only. Approved samples will become the Engineer's control samples
 - a. Submit samples not less than 12 inches by 12 inches in size of each type of sand blast finish, indicating materials and methods used to produce the sand blast finishes

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who 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."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications:
 1. Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.
 2. Comply with ACI 330, "Guide for Design and Construction of Concrete Parking Lot" unless modified by requirements in the Contract Documents.
 3. Comply with ACI 325, "Design of Jointed Concrete Pavements for Streets and Local Roads" unless modified by requirements in the Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
 1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete producer.
 - d. Concrete pavement subcontractor.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. 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.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.
- C. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
- D. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
- E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
- F. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.
- G. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- H. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

- I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
- J. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.
- K. Zinc Repair Material: ASTM A 780.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: ASTM C 150, Type I, 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 4S coarse aggregate, uniformly graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material when steel reinforcement is called out in exterior installations.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.

2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. Dry, delivered pre-wetted and soaked.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM 1752 Vinyl full depth, with joint sealant.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi, unless otherwise indicated on the drawings.
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 - 3. Slump Limit: 3 inches, or up to 5 inches with the use of a water-reducing chemical admixture.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 6 percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

- F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements and as follows:
 - 1. Fly Ash or Pozzolan: 25 percent.
 - 2. Ground Granulated Blast-Furnace Slag: 50 percent.
 - 3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.
- G. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd..

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

2.10 SPECIAL FINISHES

- A. Sand Blast Finish:
 - 1. Blasting Operations and Requirements:
 - a. Apply sandblasted finish to exposed concrete surfaces where indicated.
 - b. Perform sand blasting at least 72 hours after placement of concrete. Coordinate with formwork construction, concrete placement schedule, and formwork removal to ensure that surfaces to be blast finished are blasted at the same age for uniform results.
 - c. Determine type of nozzle, nozzle pressure, and blasting techniques required to match the Engineer's control samples.
 Abrasive blast corners and edge of patterns carefully, using back-up boards, to maintain uniform corner or edge line.
 - 2. Depths of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surface to match the Engineer's control samples as follows:
 - a. Light Sand Blast Finish: Expose fine aggregate with occasional exposure of coarse aggregate; maximum 1/16-inch reveal.
 - 3. Surface Continuity: Perform sand blast finishing in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work. Maintain patterns of variances in depths of cuts as indicated.
 - 4. Construction Joints: Use technique acceptable to the Engineer to achieve uniform treatment of construction joints.
 - 5. Protection and Repair:
 - a. Protect adjacent materials and finishes from dust, dirt, and other surface or physical damage during abrasive blast finishing operations. Provide protection as required and remove from site at completion of the work.
 - b. Repair or replace other work damaged by finishing operations.

6. Clean-up: Maintain control of concrete chips, dust, and debris in each area of the work. Clean up and remove such material at the completion of each day of operation. Prevent migration of airborne materials by use of tarpaulins, wind breaks, and similar containing devices.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades
 1. Proof rolling to be performed in presence of Architect or Construction Manager.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, Construction Manager, or Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain 2" minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

- E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.
- F. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, or through locations of intended contraction or isolation joints, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
 - 3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated, or when construction joint will experience heavy truck traffic. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint. Dowels to be epoxy coated and sized per ACI 330.
- C. Isolation (expansion) Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
 - 1. Locate expansion joints at intervals of not more than 30 feet, unless otherwise indicated.
 - 2. Extend joint fillers full width and depth of joint.
 - 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 - 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - 5. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
 - 6. Doweled Joints: Install dowel bars and support assemblies at joints where indicated, or when construction joint will experience heavy truck traffic. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint. Dowels to be epoxy coated and sized per ACI 330.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. For thickness 5 inches or less construct contraction joints for a depth equal to at least

one-third of the concrete thickness, for thickness greater than 5 inches construct contraction joints for a depth equal to at least one-quarter of the concrete thickness, as follows or match jointing of existing adjacent concrete pavement:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated, or when construction joint will experience heavy truck traffic. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint. Dowels to be epoxy coated and sized per ACI 330.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed if plastic shrinkage cracking is of concern.
- D. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- E. Comply with ACI 301 and ASTM C94, requirements for measuring, mixing, transporting, and placing concrete.
- F. A one time add of water to concrete during delivery or at Project site is permitted but the water to cementitious material ratio must not be violated.
- G. Do not add water to fresh concrete after testing.
- H. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- I. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side

forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

- J. Screed pavement surfaces with a straightedge and strike off.
- K. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- L. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- M. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finish, and jointing as required for formed pavement.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- N. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- O. 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 air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.
- P. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.

- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moist 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 prior to placement and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
 - 4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.

5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: 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 at least 1 composite sample for each 5000 sq. ft. or fraction thereof of each concrete mix placed each day.
 - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 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 mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mix will be satisfactory if average of any 3 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.
- D. 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.
- E. 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.

- F. 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.
- G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 1313

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SECTION 33 1100

WATER UTILITY DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes water-distribution piping and related components outside of the building for domestic, fire, and combined water service mains.
- B. Related Sections include the following:

1.3 DEFINITIONS

- A. PE: Polyethylene plastic.
- B. PP: Polypropylene plastic.
- C. PVC: Polyvinyl chloride plastic.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.
- C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.
- D. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. All work must be done in compliance with the local water jurisdiction having authority, the local building department, the governing fire department, and all applicable state and national codes. If local codes conflict with project specifications or project plans the contractor should contact the Construction Manager.

- B. Minimum working pressures: The following are minimum pressure requirements for piping and specialties:
 - 1. Domestic Water Service: 200 psi
 - 2. Fire Protection Water Service: 250 psi
- C. Regulatory Requirements:
 - 1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
 - 2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
 - 3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.
- D. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.
- G. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.
- H. NSF Compliance:
 - 1. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends and flange faces.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. During Storage: Use precautions for valves, including fire hydrants, according to the following:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

- D. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.
- F. Protect flanges, fittings, and specialties from moisture and dirt.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of water-distribution service without Construction Manager's permission.

1.8 COORDINATION

- A. Coordinate connection to water main with utility company.
- B. Coordinate water main installation with other utility work.

PART 2 - PRODUCTS

2.1 DUCTILE-IRON PIPE AND FITTINGS

- A. Mechanical-Joint, Ductile-Iron Pipe: Class 52 minimum, 250 psi minimum pressure rating, AWWA C151, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated. The interior of the pipe shall be cement-mortar lined and seal coated in accordance with AWWA C104. The exterior of all pipe shall receive wither coal tar or asphalt base coating a minimum of 1 mil thick.
 - 1. Mechanical-Joint, Ductile-Iron Fittings: 250 psi minimum pressure rating, AWWA C110, ductile-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Glands, Gaskets, and Bolts: AWWA C111, ductile-iron glands, rubber gaskets, and Core 10 Alloy Steel only bolts.
- B. Push-on-Joint, Ductile-Iron Pipe: Class 52 minimum, 250 psi minimum pressure rating, AWWA C151, with push-on-joint bell and plain spigot end unless grooved or flanged ends are indicated. The interior of the pipe shall be cement-mortar lined and seal coated in accordance with AWWA C104. The exterior of all pipe shall receive wither coal tar or asphalt base coating a minimum of 1 mil thick.
 - 1. Push-on-Joint, Ductile-Iron Fittings: 250 psi minimum pressure rating, AWWA C110, ductile-iron standard pattern or AWWA C153, ductile-iron compact pattern.
 - 2. Gaskets: AWWA C111, rubber.

2.2 GATE VALVES**A. AWWA, Gate Valves:**

1. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:
 - a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.
 - 1) Standard: AWWA C509.
 - 2) Minimum Pressure Rating: 250 psig.
 - 3) End Connections: Push on or mechanical joint.
 - 4) Interior Coating: Complying with AWWA C550.

2.3 GATE VALVE ACCESSORIES AND SPECIALTIES**A. Tapping-Sleeve Assemblies:**

1. Description: Sleeve and valve compatible with drilling machine.
 - a. Standard: MSS SP-60.
 - b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
 - c. Valve: AWWA, cast-iron, nonrising-stem, resilient-seated gate valve with one raised face flange mating tapping-sleeve flange.

B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.**2.4 CHECK VALVES****A. AWWA Check Valves:**

1. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.
 - a. Standard: AWWA C508.
 - b. Pressure Rating: 250 psig.

2.5 DETECTOR CHECK VALVES**A. Detector Check Valves:**

1. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass

meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.

- a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 250 psig.
 - c. Bypass Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.
2. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.
 - a. Standards: UL 312 and FMG approved.
 - b. Pressure Rating: 250 psig.

2.6 WATER METERS

- A. Water meters are to be per the requirements of the authority having jurisdiction.

2.7 BACKFLOW PREVENTERS

- A. Double-Check, Backflow-Prevention Assemblies:
 1. As required per the jurisdiction having authority.
- B. Double-Check, Detector-Assembly Backflow Preventers:
 1. As required per the jurisdiction having authority.

2.8 WATER METER BOXES

- A. As required per the jurisdiction having authority.
- B. Description: Cast-iron body and cover for disc-type water meter, with lettering "WATER METER" in cover; and with slotted, open-bottom base section of length to fit over service piping.

2.9 CONCRETE VAULTS

- A. As required per the jurisdiction having authority.
- B. Description: Precast, reinforced-concrete vault.
 1. Drain: Provide a gravity drain line from the pit to a suitable open daylight drainage point or storm sewer; or provide a sump pump and appurtenances with associated piping to suitable outlet point.

2.10 FIRE HYDRANTS

- A. Dry-Barrel Fire Hydrants:
 1. As required per the jurisdiction having authority.

2. Description: Freestanding, with one 5-inch Storz connection and two NPS 2- 1/2 outlets, 5- 1/4-inch main valve, drain valve, and NPS 6 mechanical-joint inlet. Include interior coating according to AWWA C550. Hydrant barrel shall have safety breakage feature above the ground line. Hydrant shall have cast-iron body, compression-type valve opening against pressure and closing with pressure so that the valve remains closed should the barrel be broken off.
 - a. Standard: AWWA C502.
 - b. Pressure Rating: Minimum 250 psig.
 - c. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
 - d. Operating and Cap Nuts: Pentagon, 1-1/2 inches point to flat.
 - e. Direction of Opening: Open hydrant valve by turning operating nut to left or counterclockwise.

2.11 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

1. As required per the jurisdiction having authority.
2. Fire department connections for sprinkler/stand pipe systems to be equipped with 5-inch Storz connection.

PART 3 - EXECUTION

3.1 EARTHWORK

A. General:

1. Conduit Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type B Conduits.
2. Conduit Not Under Pavement: Refer to The Ohio Department of Transportation Construction and Material Specifications Item 603.02, Type C Conduits.

B. Excavation For Utility Trenches:

1. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
2. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit.
3. Excavate trench walls per ODOT Item 603.05 and geotechnical report as identified on the Drawings.
4. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches below invert elevation to receive bedding course.

C. Utility Trench Backfill:

1. Place and compact bedding course as required by ODOT specifications Item 603.06 and geotechnical report. Type 2 bedding consists of structural backfill extending at least 3 inches (75 mm) for all ODOT Item 706 rigid pipe conduits and 6 inches (150 mm) for all other conduits below the bottom of the conduit for the full width of the trench. Extend the bedding up around the pipe for a depth of not less than 30 percent of the rise of the conduit.

Shape the bedding to fit the conduit with recesses shaped to receive the bell of bell-and-spigot pipe. Leave the bedding below the middle one-third of the pipe span uncompacted. Compact the remaining bedding according to ODOT Item 603.11.

2. Use Type 2 bedding for Types A, B, C, and D conduits except for long span structures and for conduits that require Type 3 bedding.
3. Type 3 bedding consists of a natural foundation with recesses shaped to receive the bell of bell-and-spigot pipe. Scarify and loosen the middle one-third of the pipe span.
4. Use Type 3 bedding for Type C and Type D conduits of the following materials: ODOT Items 706.01, 706.02, or 706.03.
5. Structural backfill for ODOT Item 603 bedding and backfill shall consist of limestone, gravel, natural sand, sand manufactured from stone, or foundry sand. Provide Type I or Type II structural backfill per the requirements of ODOT Item 703.11
6. Non-structural backfill should consist of clean, inorganic soil free of any miscellaneous materials, cobbles, and boulders. The fill should be placed in uniform, thin lifts and carefully compacted to a unit dry weight equal to 100 percent in structure areas and at least 98 percent of the maximum dry weight below pavement areas. The moisture content of the fill should be maintained at -2 to +1 percent of the optimum moisture content as determined in the laboratory by the Standard Test Methods for Moisture-Density Relations of Soils (ASTM D 698). Fill should not be placed in a frozen condition or upon a frozen subgrade.
7. Place backfill to the limits described and according to the compaction requirements of ODOT Item 603.11. Place the backfill in the trench and embankment outside the trench uniformly on both sides of the conduit for all conduit installations.
 - a. Type A and B. Backfill Types A and B conduits except for long span structures as follows
 - 1) In a cut situation, place and compact structural backfill above the bedding for the full depth of the trench. Within the trench and more than 4 feet (1.2 m) above the top of the conduit, if the trench can accommodate compaction equipment, the Contractor may construct Item 203 Embankment. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
 - 2) In a fill situation, place and compact structural backfill above the bedding for the full depth of the trench specified in 603.05.B. Above these limits, uniformly place the lesser of one pipe span or 4 feet (1.2 m) of structural backfill on each side of the conduit and to a depth of 2 feet (0.6 m) above the top of the conduit. Construct the embankment outside the limits of the backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
 - b. Type C and D. Backfill Type C and D conduits as follows:
 - 1) In a cut situation, for plastic pipe, place and compact structural backfill above the bedding and to 12 inches (300 mm) over the top of the pipe. All other conduit material types place and compact backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.
 - 2) In a fill situation, for plastic pipe, place and compact structural backfill above the bedding for the full depth of the trench specified in 603.05.B. Above these limits, uniformly place the lesser of one pipe span or 4 feet (1.2 m) of

structural backfill on each side of the conduit and vertically to the top of the conduit. Then place for a depth of 12 inches (300 mm) structural backfill over the top of the pipe equal to the trench width centered on the pipe center line. Construct the embankment outside the limits of the backfill. All other conduit material types place and compact backfill. For plastic pipe with an ID 8 inch (200 mm) or less, place and compact structural backfill above the bedding for the full depth of the trench.

8. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
9. All fill soils shall be placed in accordance with the article "Compaction of Soil Backfills and Fills" from the Earth Moving Specification Section 312000.
10. Coordinate backfilling with utilities testing.
11. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
12. Place and compact final backfill of satisfactory soil material to final subgrade.

3.2 PIPING INSTALLATION

- A. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.
 1. Make connections larger than NPS 2 with tapping machine in accordance with the jurisdiction having authority.
 2. Make connections NPS 2 and smaller with drilling machine in accordance with the jurisdiction having authority.
- B. Comply with NFPA 24 for fire-service-main piping installation.
- C. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.
- D. Bury piping with depth of cover over top at least 48 inches below finish grade.
- E. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.
- F. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.
 1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.
- G. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

3.3 ANCHORAGE INSTALLATION

- A. Anchorage, General: Only the following may be used for anchorages and restrained-joint types:
 1. Concrete thrust blocks.

2. Locking mechanical joints.
 3. Set-screw mechanical retainer glands.
 4. Bolted flanged joints.
 5. Pipe clamps and tie rods.
- B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches.
- C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.4 VALVE INSTALLATION

- A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.
- B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.
- C. MSS Valves: Install as component of connected piping system.
- D. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

3.5 DETECTOR-CHECK VALVE INSTALLATION

- A. Install in vault or aboveground.
- B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.
- C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.6 WATER METER INSTALLATION

- A. Install water meters, piping, and specialties according to utility company's written instructions.

3.7 BACKFLOW PREVENTER INSTALLATION

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.
- B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.
- C. Do not install bypass piping around backflow preventers.
- D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.8 WATER METER BOX INSTALLATION

- A. Install water meter boxes in paved areas flush with surface.
- B. Install water meter boxes in grass or earth areas with top 1 inch above surface.

3.9 CONCRETE VAULT INSTALLATION

- A. Install precast concrete vaults according to ASTM C 891.

3.10 FIRE HYDRANT INSTALLATION

- A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints and thrust blocks, and support in upright position.
- B. AWWA Fire Hydrants: Comply with AWWA M17.

3.11 FIRE DEPARTMENT CONNECTION INSTALLATION

- A. Install ball drip valves at each check valve for fire department connection to mains.

3.12 CONNECTIONS

- A. Connect water-distribution piping to existing water main. Use tapping sleeve and tapping valve, or service clamp and corporation valve.
- B. Connect water-distribution piping to interior domestic water and fire-suppression piping if in place. Coordinate connection with plumber.
- C. Connect drainage piping from concrete vault drains to storm-drainage system swale or pipe.

3.13 FIELD QUALITY CONTROL

- A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.
- B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.
 - 1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.
 - 2. All pipe, fittings and other materials found to be defective under test shall be removed and replaced at the contractors expense.
- C. Prepare reports of testing activities.

3.14 CLEANING

- A. Clean and disinfect water-distribution piping as follows:
 - 1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.
 - 2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:
 - a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
 - b. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
 - c. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.
- B. Prepare reports of purging and disinfecting activities.

END OF SECTION 33 1100

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