

AGENDA
VALLEY CITY COUNCIL
June 25, 2024 7:00 PM

Anyone desiring to speak on any item on the Agenda is invited to do so during the visitor/correspondence section but will be limited to three minutes. After being recognized by the Mayor, please state your name and address for the record. Anyone desiring to speak for a longer period of time should make arrangements with the City Clerk prior to the meeting. A person wishing to speak during the business portion of the meeting must complete a City Council Agenda Request form. This form is available on the City's website and must be completed and submitted no later than 5:00 p.m. on the Thursday preceding any City Council meeting.

--A copy of the Open Meetings Act is located on the north wall of the Council Chamber—

The Mayor and Council reserve the right to adjourn into executive session on any agenda item per Nebraska Revised Statutes 84-1410.

One copy of all reproducible written material to be discussed at this meeting is available for examination or copying.

1. CALL TO ORDER
2. ROLL CALL
3. PLEDGE OF ALLEGIANCE
4. PROOF OF PUBLICATION
5. VISITORS & CORRESPONDENCE
6. APPROVAL OF AGENDA
7. AUDIT - presentation and approval of audit and submission to the State Auditor for FY2022-2023.
8. CITY PARK - discussion
9. 270th ST. and MAPLE ST. - discussion
10. ADJOURN

I. CD - NOTICE OF SPECIAL MTG - CITY COUNCIL - 6/25/24 (CITY OF VALLEY)

**NOTICE OF SPECIAL MEETING
CITY OF VALLEY
TUESDAY, JUNE 25, 2024, AT 7:00 P.M.
VALLEY CITY HALL
203 N. SPRUCE STREET, VALLEY, NE**

Notice is hereby given that a special meeting of the City Council of the City of Valley, Nebraska will be held on Tuesday, June 25, 2024, at 7:00 p.m. at Valley City Hall.

The purpose of the special meeting is to review the audit and recommend its submission to the State.

An agenda kept continuously current shall be available for public inspection at Valley City Hall (203 N. Spruce Street).

Christie Donnermeyer, City Clerk

6/19 ZNEZ

**THE DAILY RECORD
OF OMAHA
JASON W. HUFF, Publisher
PROOF OF PUBLICATION**

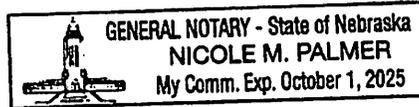
UNITED STATES OF AMERICA,
The State of Nebraska,
District of Nebraska,
County of Douglas,
City of Omaha

} ss.

JASON W. HUFF and/or JOSIE CHARRON, being duly sworn, deposes and say that they are the PUBLISHER and/or MANAGING EDITOR of THE DAILY RECORD, of Omaha, a legal newspaper, printed and published daily in the English language, having a bona fide paid circulation in Douglas County in excess of 300 copies, and a general circulation in Sarpy, Lancaster, Cass and Dodge Counties, printed in Omaha, in said County of Douglas, Nebraska for more than fifty-two weeks last past; that the printed notice here-to attached was published in THE DAILY RECORD, of Omaha, for 1 consecutive weeks on:

6/19/24

That said Newspaper during that time was regularly published and in general circulation in the County of Douglas, and State of Nebraska.



Publisher's Fee \$22.67

Jason W. Huff

Additional Copies \$ _____

Subscribed in my presence and sworn to before me this JUNE 19 2024

Filing Fee \$ _____

Total \$22.67

Nicole M. Palmer

Notary Public in and for Douglas County, State of Nebraska



Bid Tab

PROJECT | Valley City Park - Phase 1 Renovation

JEO PROJECT NO. | 221849.01

LOCATION | Valley, Nebraska

LETTING | June 13, 2024 at 2:00pm

OPINION OF PROBABLE COST | \$1,500,000.00

Bidder	Total Base Bid	Alternate 1 (deduct) North Parking Lot	Alternate 2 (add) Pickleball Court Lighting	Alternate 3 (add) Shelter Lighting and Power	Unit Price No 1 Unsuitable Material Below Exposed Subgrade (CY)	Unit Price No 2 Place and finish Add'l 5" concrete (SF)	Acknowledge Addenda (2)	Bid Bond Present	Notes
BD Construction Columbus, NE									
DR Anderson Constructors Omaha, NE	\$1,700,000.00	\$11,300.00	\$34,200.00	\$27,600.00	\$53.00	\$10.00	✓	✓	
Eriksen Construction Co., Inc. Blair, NE									
Graham Construction, Inc. Omaha, NE	\$1,646,157.00	\$15,000.00	\$35,225.00	\$28,432.00	\$30.00	\$9.00	✓	✓	
HD Utilities and Grading, LLC. LaVista, NE	\$1,664,310.00	\$18,724.00	\$37,138.00	\$29,976.00	\$28.00	\$6.35	✓	✓	
JMN Construction LLC Valley, NE	\$1,524,215.00	\$30,000.00	\$37,000.00	\$30,000.00	\$30.00	\$10.00	✓	✓	
MECO-HENNE Contracting, Inc. Omaha, NE	\$1,438,000.00	\$5,000.00	\$35,509.00	\$22,111.00	\$35.00	\$10.50	✓	✓	Apparent Low Bid
Nemaha Sports Construction Lincoln, NE									
NLC, LLC York, NE									
PCC Sports Lees Summit, MO									
Sampson Construction Co., Inc. Lincoln, NE	\$1,524,000.00	\$14,000.00	\$36,000.00	\$29,000.00	\$25.00	\$5.50	✓	✓	
Valley Corporation Valley, NE									
Vrana Construction Omaha, NE									



June 21, 2024

Christie Donnermeyer, City Clerk
City of Valley
203 N Spruce Street
Valley, Nebraska 68064

RE: Valley, NE – Valley City Park – Phase 1 Renovation, Bid Summary and Recommendation
JEO Project No: 221849.01

Dear Christie,

JEO Consulting Group (JEO) has completed the review of bids received for the construction of the Valley City Park -Phase 1 Renovation Project. This letter summarizes our findings and provides a recommendation for the award of the construction contract.

Six (6) contractors submitted bids during the public bid opening held on June 13, 2024. A detailed breakdown of the bids is attached as **Exhibit A**. All bidders submitted base bids, bid bonds, and acknowledged acceptance of two addenda.

JEO recommends awarding to the lowest responsible bidder, **MECHO-HENNE Contracting**.

Approved

x	Base Bid	Phase 1 Renovation	\$1,438,000.00
	Alternate 1	North Parking Lot - deduct	(\$5,000.00)
x	Alternate 2	Pickle Ball Court Lighting	\$35,509.00
x	Alternate 3	Shelter Lighting and Power	\$22,111.00
		Total Project Cost:	\$1,495,620.00

JEO welcomes any questions or concerns you may have regarding this information and recommendation. We appreciate the opportunity to be involved in this exciting project and look forward to contributing to its successful completion.

Sincerely,

Eric J. Casper, PLA
JEO Consulting Group, Inc.

Dave Ptak

From: Doug Eggen
Sent: Friday, June 21, 2024 7:25 AM
To: Williams, Eric
Cc: Cindy Grove; Dave Ptak
Subject: RE: Grant Announcement

Eric,

That's great news. Thank you very much! We really appreciate the NRD's support. I assume there will be a confirmation once the budget has been approved.

Doug Eggen
Public Works Superintendent
City of Valley
203 N Spruce St
P O Box 682
Valley NE 68064
deggen@valleyne.org
Office – (402) 359-2251 x 313
Cell – (402) 669-7951



ATTENTION ELECTED OFFICIALS: A "Reply to All" on this e-mail could lead to violations of the Nebraska Open Meetings Act. Please reply only to the sender.

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From: Williams, Eric <ewilliams@papionrd.org>
Sent: Thursday, June 20, 2024 3:27 PM
To: Doug Eggen <deggen@valleyne.org>
Subject: RE: Grant Announcement

EXTERNAL EMAIL

Doug,

Your project for the **Park Renovation Phase 1** was approved by the Papio NRD Board of Directors for **\$50,000** and will be included into the initial draft of our upcoming FY 2025 budget. All projects are subject to funding availability until the budget is finalized during our Board meeting in September.

Please feel free to contact me with any questions and thank you for working to provide recreation and access to natural resources for people in our community.

Eric Williams (he/him)

Natural Resources Planner

Papio-Missouri River Natural Resources District
direct (402) 315-1704

From: Doug Eggen <deggen@valleyne.org>
Sent: Wednesday, June 19, 2024 11:16 AM
To: Williams, Eric <ewilliams@papionrd.org>
Subject: Grant Announcement

Hi Eric,

I am just following up regarding the announcement of the awards for the NRD grants. I hadn't heard anything yet and we are getting to the stage in the park renovation process that I need to start looking at picnic tables, etc.

If you can let me know the results, I would appreciate it.

Thanks

Doug Eggen
Public Works Superintendent
City of Valley
203 N Spruce St
P O Box 682
Valley NE 68064
deggen@valleyne.org
Office – (402) 359-2251 x 313
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**PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR
VALLEY CITY PARK - PHASE 1 RENOVATIONS
FOR
VALLEY, NE**

ADDENDUM NO. 1

May 29, 2024

TO: PLANS, SPECIFICATIONS AND BIDDING DOCUMENTS FOR THE VALLEY CITY PARK - PHASE 1
REOVATIONS (JEO PROJECT NO. 221849.01).

NOTICE:

THIS ADDENDUM IS ISSUED BY JEO CONSULTING GROUP, INC. TO ALL KNOWN INDIVIDUALS, FIRMS OR
CORPORATIONS WHO HAVE OBTAINED OR RECEIVED BIDDING DOCUMENTS AND CONTRACT
DOCUMENTS FOR ABOVE LISTED PROJECT.

THIS ADDENDUM IS HEREBY MADE A PART OF THE BIDDING DOCUMENTS OR CONTRACT DOCUMENTS,
AS APPROPRIATE. BIDDERS ARE REQUIRED TO ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN
APPROPRIATE SPACE ON THE BID FORM.

CHANGES TO THE SPECIFICATIONS:

1. Refer to Section 00 21 13 – Instructions to Bidders.

Replace this section in its entirety.

CHANGES TO THE DRAWINGS:

1. Refer to Sheet C101.

Trees shown to be removed from project site will be removed as part of separate bid/project prior
to start of Valley City Park Phase 1 Renovation work.

Note added referencing existing elephant slide slated for removal from project site will need to
be removed and turned over to the owner for donation to other entity.

2. Refer to Sheet C401.

Construction fencing and erosion control measures updated.

3. Refer to Sheet L201.

Irrigation plan updated.

APPROVAL OF ADDITIONAL PRODUCTS/SYSTEMS:

1. NovaSports has been approved as an equal for the Acrylic Color Coating Surfacing For Post Tensioned Courts.
2. Sikasil 290/295 and Sikaflex 1c SL/NS have been approved as equals to Specification Section 323273, Page 2, Article/Paragraph 2.01(A, B, and C).

CLARIFICATIONS:

1. Pre-bid Conference Sign-in Sheet is attached for reference.
2. JEO is not under contract to complete construction staking services. If contractors would like to hire JEO for such services, please contact Noah Jensen (402) 990-3694 or email njensen@jeo.com

QUESTIONS:

1. Contact information for project coordination with OPPD.
 - a. Mike Krepela – mkrepela@oppd.com
 - b. Bert Adams
2. The two trees (located just north of the camper/camping stalls) slated to be relocated WILL be part of this project.
3. Contractor will be responsible for SWPPP inspections and reports.

A current plan holders list can be viewed at jeo.com/bidding. In order to bid the project, the contract documents must be issued directly by JEO Consulting Group, Inc. or QuestCDN to the bidder. All bidders must be on the plan holders list at the time of the letting.

All other requirements of the Plans, Specifications and Contract Documents remain in effect. This addendum shall be attached to and made a part of the Plans, Specifications and Contract Documents and receipt shall be acknowledged by the Bidder on the Proposal submitted.

END OF ADDENDUM NUMBER 1



Jon Hauck
May 29, 2024

**SECTION 00 21 13
INSTRUCTIONS TO BIDDERS**

INVITATION

1.01 BID SUBMISSION

- A. Bids signed, executed, and dated will be received at the City of Valley, located at 203 N Spruce Street, Valley, NE 68064 before 2:00 pm local standard time on 13th day of June 2024.
- B. Offers submitted after the above time shall be returned to the bidder unopened.
- C. Offers will be opened publicly immediately after the time for receipt of bids.
- D. Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if endorsed by the same party or parties who signed and sealed the offer.

1.02 CONTRACT TIME

- A. The work under this Contract shall commence within seven (7) days of fully executed Contract between the Owner and Contractor and shall be completed by the date as entered on the bid form.
- B. The bidder, in submitting an offer, accepts the Contract Time period stated for performing the Work. The completion date in the Agreement shall be the Contract Time added to the commencement date. The bidder may suggest a revision to the Contract Time with a specific adjustment to the Bid Amount.

BID DOCUMENTS AND CONTRACT DOCUMENTS

2.01 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.
- B. Contract Documents: Defined in AIA A201 Article 1 including issued Addenda.
- C. Bid, Offer, or Bidding: Act of submitting an offer under seal.
- D. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

2.02 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified as Project Number 221849.01, as prepared by JEO Consulting Group, Inc., and with contents as identified in the Table of Contents.

2.03 AVAILABILITY

- A. Bid Documents may be obtained by download in PDF format from JEO's website at jeo.com for a non-refundable fee or at the office of Architect, which is located at 2000 Q Street, Suite 500, Lincoln, NE 68503 p) 402.435.3080.
- B. Refer to Section 00 11 13 ADVERTISEMENT FOR BIDS for deposits required.

2.04 EXAMINATION

- A. Bid Documents may be viewed at the office of Architect.
- B. Bid Documents may be viewed at the office of Owner.
- C. Bid Documents are available for viewing purposes at the following locations:
 - 1. Office of JEO Consulting Group Inc.
 - 2000 Q Street, Suite 500.
 - Lincoln NE 68503.
 - p) 402.435.3080
 - f) 402.435.4110
 - 2. Lincoln Builders Bureau

5910 S 58th St Ste C
Lincoln NE 68516-6410
p) 402.421.8332
f) 402.421.8334

3. Dodge Data & Analytics
dodge.bidding@construction.com
www.construction.com
p) 800.393.6343
f) 800.768.5594
4. Omaha Builders Exchange
4159 South 94th Street
Omaha NE 68127-1223
p) 402.991.6906
f) 402.884.7055
5. Columbus Area Chamber of Commerce
764 33rd Ave
Columbus NE 68601-6428
p) 402.564.2769
f) 402.564.2026
6. Norfolk Builders Exchange
c/o Norfolk Area Chamber of Commerce
609 W Norfolk Ave
Norfolk NE 68701-5140
p) 402.371.4862
f) 402.371.0182

- D. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- E. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

2.05 INQUIRIES/ADDENDA

- A. Direct questions to Jonathan Hauck with JEO Consulting Group, telephone; 402.435.3080, email: jhauck@jeo.com.
- B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

2.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

- A. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 10 days before receipt of bids.
- B. When a request to substitute a product is made, Architect may approve the substitution and will issue an Addendum to known bidders.
- C. The submission shall provide sufficient information to determine acceptability of such products.
- D. Provide complete information on required revisions to other work to accommodate each proposed substitution.
- E. Provide products as specified unless substitutions are submitted in this manner and accepted.

2.07 SITE EXAMINATION

- A. Examine the project site before submitting a bid.

2.08 PREBID CONFERENCE

- A. A bidders conference has been scheduled for 10:00 am on 23rd day of May 2024 at the following location: Valley Park, W Vass Street, Valley, NE
- B. Representatives of JEO Architecture, Inc., will be in attendance.
- C. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

2.09 PROJECT REQUIREMENTS

- A. The contractor agrees that he or she will not induce, by any means, any person employed in the construction, completion, or repair of public work to give up any part of the compensation to which he or she is otherwise entitled.
- B. Federal Water Pollution Control Act
 - 1. The contractor is required to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401–7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251–1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).
- C. Comply with Contract Work Hours and Safety Standard Act (40 U.S.C 3702 and 3704), as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.
- D. Accessibility
 - 1. The Project must comply with the requirements of the Americans with Disabilities Act of 1990 42 U.S.C. §§12101 et seq. (“ADA”) and Architectural Barriers Act of 1968 42 U.S.C. §§4151 et seq. (“ABA”) and regulations promulgated thereunder. The guidelines can be accessed on the following webpage: <https://access-board.gov/ada/>
- E. A current plan holders list can be viewed at jeo.com/bidding. In order to bid the project, the contract documents must be issued directly by JEO Consulting Group, Inc. or QuestCDN to the bidder. All bidders must be on the plan holders list at the time of the letting.

QUALIFICATIONS

3.01 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.
- B. Refer to General Conditions.

BID SUBMISSION

4.01 SUBMISSION PROCEDURE

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.

- B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside. Include with bid Form fully executed USDA forms identified to be submitted with bid.
- C. Improperly completed information, irregularities in security deposit, may be cause not to open the Bid Form envelope and declare the bid invalid or informal.
- D. An abstract summary of submitted bids will be made available to all bidders following bid opening.

4.02 BID INELIGIBILITY

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Owner, be waived.

BID ENCLOSURES/REQUIREMENTS

5.01 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond of a sum no less than 5 percent of the Bid Amount on AIA A310 Bid Bond Form.
- B. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.
- C. The security deposit will be returned after delivery to the Owner of the required Performance and Payment Bond(s) by the accepted bidder.
- D. Include the cost of bid security in the Bid Amount.
- E. After a bid has been accepted, all securities will be returned to the respective bidders.
- F. If no contract is awarded, all security deposits will be returned.

5.02 PERFORMANCE ASSURANCE

- A. Accepted Bidder: Provide a Performance and Payment bond as described in 00 73 00 - Supplementary Conditions.
- B. Include the cost of performance assurance bonds in the Bid Amount.

5.03 INSURANCE

- A. Provide an executed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.
- B. The contractor will be required to obtain Builders Risk Insurance. Include the cost of the insurance in the Bid Amount.

5.04 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.

5.05 SALES AND USE TAXES

- A. The City of Valley is a tax-exempt entity.

5.06 BUILDING PERMITS

- A. The contractor will be required to obtain all necessary building permits from the Authorities Having Jurisdiction. Include all permitting fees within the Bid Amount.

5.07 FEES FOR CHANGES IN THE WORK

- A. Include the fees for overhead and profit on own Work and Work by subcontractors, identified in Document 00 73 00 - Supplementary Conditions.

5.08 BID FORM SIGNATURE

- A. The Bid Form shall be signed by the bidder, as follows:
 1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
 2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
 4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

OFFER ACCEPTANCE/REJECTION

6.01 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the bid closing date.

6.02 ACCEPTANCE OF OFFER

- A. Owner reserves the right to accept or reject any or all offers.
- B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Bid Acceptance.

END OF SECTION

GENERAL TREE/ROOT PROTECTION NOTES:

- REFER TO ANSI A300 TREE CARE STANDARDS FOR PLANTING, CARE, AND PROTECTION OF TREES
- PRESERVE & PROTECT THE ROOT ZONE OF ALL TREES TO REMAIN FROM CONSTRUCTION ACTIVITIES. PROVIDE TEMPORARY FENCING, 2 FEET OUTSIDE OF EACH TREE WITHIN THE LIMITS OF CONSTRUCTION (LOC). THIS IS THE TREE/ROOT PROTECTION ZONE. IN AREAS WHERE THE DRIP LINES TOUCH OR ARE CLOSE, A SINGLE FENCE INSTALLATION CAN ENCOMPASS THE COMBINED TREE/ROOT PROTECTION ZONES. FENCING CAN ALSO DOUBLE AS THE LOC FENCING, REF. THIS SHEET.
- INSTALL TEMPORARY FENCING AND RECEIVE APPROVAL OF THE LANDSCAPE ARCHITECT PRIOR TO ANY DEMOLITION WORK OR TRAVERSING OF THE SITE BY VEHICLE OR OTHER MACHINERY.
- VEHICULAR TRAFFIC AND STORAGE OF ANY MATERIAL IS PROHIBITED IN THE TREE/ROOT PROTECTION ZONES.
- GRADING AND DUMPING OF CHEMICALS OR OTHER MATERIALS IS PROHIBITED IN THE TREE/ROOT PROTECTION ZONES.
- MINIMIZE FOOT TRAFFIC AND SPREAD WOOD MULCH OVER TREE/ROOT PROTECTION ZONES WHEN NECESSARY TO COMPLETE DEMOLITION, CONSTRUCTION, OR TREE REMOVALS. BRIDGE OVER THE ROOT ZONE TO ELIMINATE COMPACTION.
- WHEN IT IS NECESSARY TO CUT ROOTS FOR DEMOLITION OR NEW CONSTRUCTION, CLEANLY PRUNE/CUT ROOTS AND REFILL CUT AREA WITH PLANTING BED SOIL AND WATER IMMEDIATELY.
- REPAIR AND MULCH EFFECTED PLANTING BEDS, AND OVER SEED TURF AREAS IMMEDIATELY AFTER CHAIN LINK FENCE IS REMOVED AT THE END OF CONSTRUCTION.

GENERAL TREE REMOVAL NOTES:

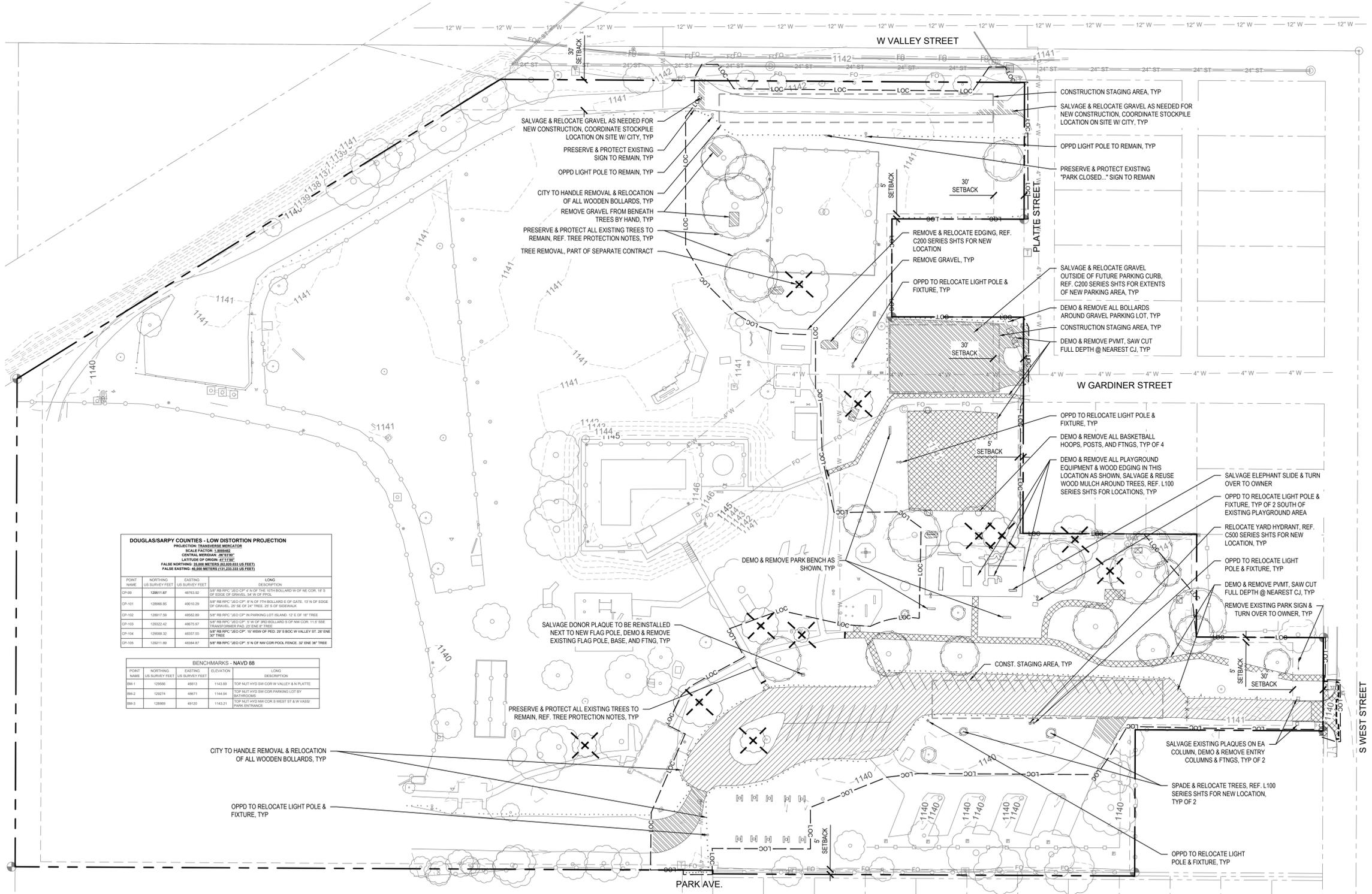
- CLEAR AND GRUB TREES AS SHOWN TO A DEPTH OF 6 INCHES BELOW GRADE (WHERE POSSIBLE).
- MINIMIZE DISTURBANCE TO TREES, TURF, AND OTHER PLANTS THAT ARE TO REMAIN ON SITE. RESPECT TREE/ROOT PROTECTION ZONES, AND WHEN NECESSARY, REMOVE TREES BY HAND WITHOUT THE AID OF LARGE MACHINERY.
- COORDINATE REMOVAL OF TREES WITH SEASONAL NESTING OF LOCAL BIRD POPULATIONS. IF REMOVAL OF TREES IS TO OCCUR DURING A SEASONAL NESTING PERIOD, CONTRACTOR IS REQUIRED TO PERFORM A SURVEY (OF TREES TO BE REMOVED) TO ENSURE THAT NO NESTS WILL BE DISTURBED.

EXISTING LEGEND

- PROPERTY LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- FENCE
- 8" SAN - SANITARY SEWER
- 6" W - WATER
- STORM SEWER
- BENCHMARK
- MONUMENT FOUND (PROPERTY)
- CURB INLET
- GRATE INLET
- CATCH BASIN
- STORM SEWER MANHOLE
- CLEANOUT
- SEPTIC TANK
- SANITARY MANHOLE
- GUY WIRE ANCHOR
- ELECTRICAL HIGHLINE TOWER
- POWER POLE (EXISTING)
- POWER (ELEC) PEDESTAL
- POWER (ELEC) PULL BOX OR MANHOLE
- POWER (ELEC) METER
- LIGHT POLE
- TELEVISION PEDESTAL
- TELEVISION MANHOLE
- WATER MANHOLE
- WATER VALVE
- WATER SHUT OFF OR CURB STOP
- WELL
- WATER METER
- WATER METER PIT
- YARD HYDRANT
- FIRE HYDRANT
- GAS METER
- GAS MANHOLE
- GAS FILL PIPE
- GAS PUMP
- GAS VALVE
- FIBER OPTICS PULL BOX
- TELEPHONE POLE
- TELEPHONE PULL BOX OR MANHOLE
- TELEPHONE PEDESTAL
- MANHOLE (NON-SPECIFIC)
- VALVE (NON-SPECIFIC)
- SIGN
- FLAG POLE
- BUSH
- CONIFEROUS TREE
- DECIDUOUS TREE
- MARSHWETLAND
- TREE MASS LINE
- TREE STUMP

REMOVALS LEGEND

- ASPHALT PAVEMENT REMOVAL
- CONCRETE PAVEMENT REMOVAL
- GRAVEL REMOVAL
- FENCE / WALL REMOVAL
- TREE REMOVAL (SEPARATE CONTRACT)
- SAW CUT PAVEMENT FULL DEPTH



DOUGLAS/SARPY COUNTIES - LOW DISTORTION PROJECTION
 PROJECTION: TRANSVERSE MERCATOR
 SCALE FACTOR: 0.99999
 CENTRAL MERIDIAN: 96°33'00"
 FALSE NORTHING: 25,000 METERS (82,000.00 US FEET)
 FALSE EASTING: 500,000 METERS (1,640,000.00 US FEET)

POINT NAME	NORTHING US SURVEY FEET	EASTING US SURVEY FEET	LONG DESCRIPTION
CP-99	12861.847	48763.92	5/8" IR NPIC 1/200 CIP 4" NIP 1/2" BOLLARD W/ 9" NE COR. 18" S OF EDGE OF GRAVEL. 54" W OF TYP.
CP-101	12866.85	48762.29	5/8" IR NPIC 1/200 CIP 4" NIP 1/2" BOLLARD S OF GRATE. 12" IN OF EDGE OF GRAVEL. 20" SE OF 5/8" TREE. 25" S OF SIDEWALK.
CP-102	128617.58	48852.89	5/8" IR NPIC 1/200 CIP IN PARKING LOT ISLAND. 12" E OF 18" TREE.
CP-103	128552.42	48875.87	5/8" IR NPIC 1/200 CIP 5" W OF 2ND BOLLARD S OF NW COR. 11" SSE 1780557 CONCRETE PAV. 22" ENE OF TREE.
CP-104	128668.32	48937.55	5/8" IR NPIC 1/200 CIP 15" WSW OF PED. 29" S BOC W VALLEY ST. 28" ENE OF TREE.
CP-105	128211.89	48384.87	5/8" IR NPIC 1/200 CIP 5" N OF NW COR POOL FENCE. 32" ENE 38" TREE.

BENCHMARKS - NAVD 88			
POINT NAME	NORTHING US SURVEY FEET	EASTING US SURVEY FEET	LONG DESCRIPTION
BM-1	128666	48853	TOP NUT W/NO SIV COR W VALLEY & N PLATTE
BM-2	128274	48871	TOP NUT W/NO SIV COR PARKING LOT BY SW TRUSCO
BM-3	128868	49100	TOP NUT W/NO NW COR S WEST ST & W VASSI PARK ENTRANCE



2024
 CITY OF VALLEY
 VALLEY CITY PARK - PHASE 1 RENOVATIONS
 VALLEY, NE

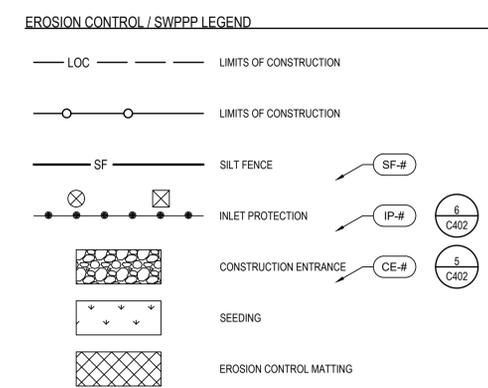
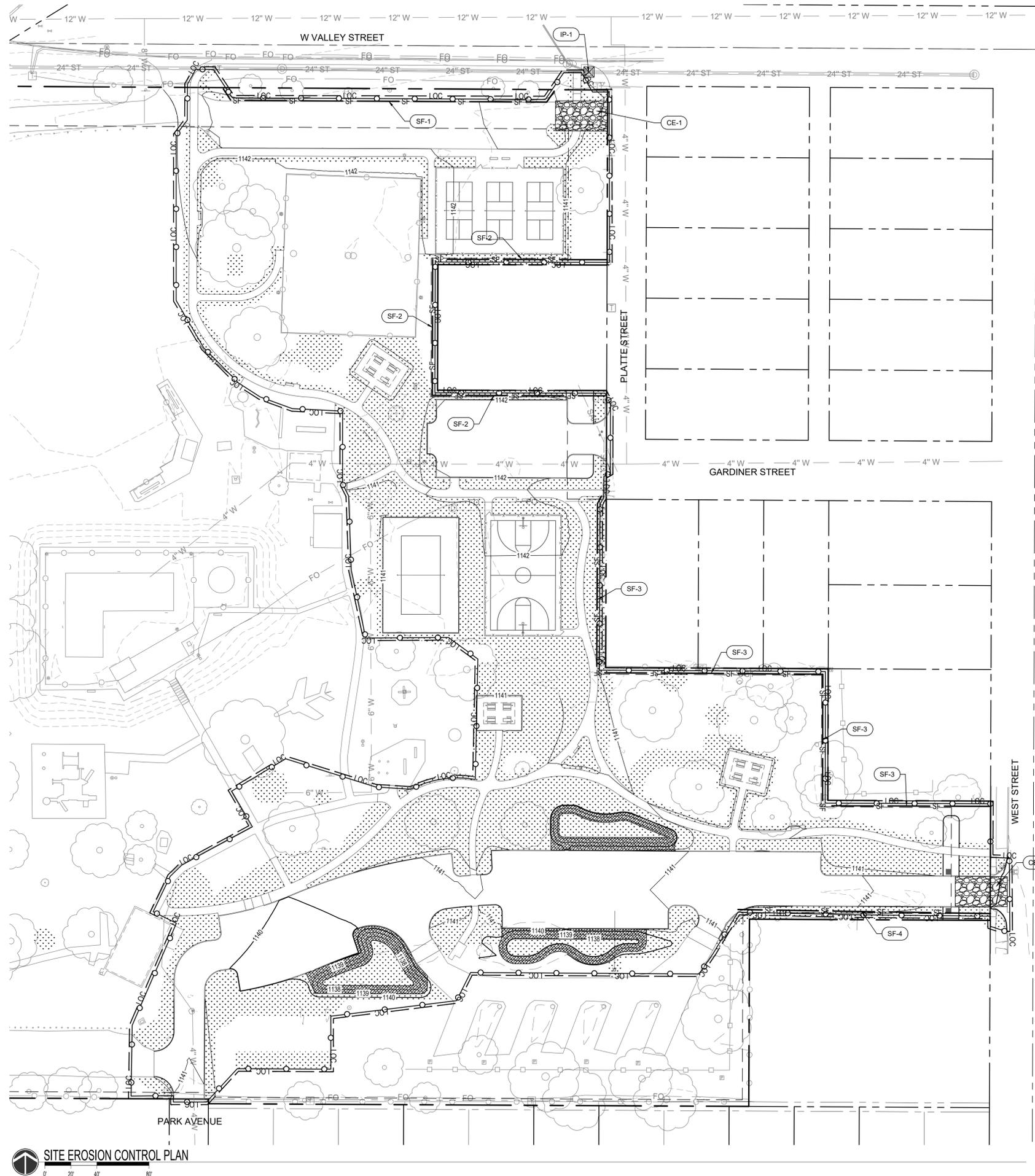


REVISIONS

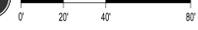
NO.	DESCRIPTION	DATE
A1	ADDENDUM 1	05/29/24

DATE: 05/15/2024
 PROJECT NO.: 221849.01
 DRAWN BY: JH
 REVIEWED BY: TJ

EXISTING CONDITIONS &
 DEMOLITION PLAN



SITE EROSION CONTROL PLAN



2024
 CITY OF VALLEY
 VALLEY CITY PARK - PHASE 1 RENOVATIONS
 VALLEY, NE

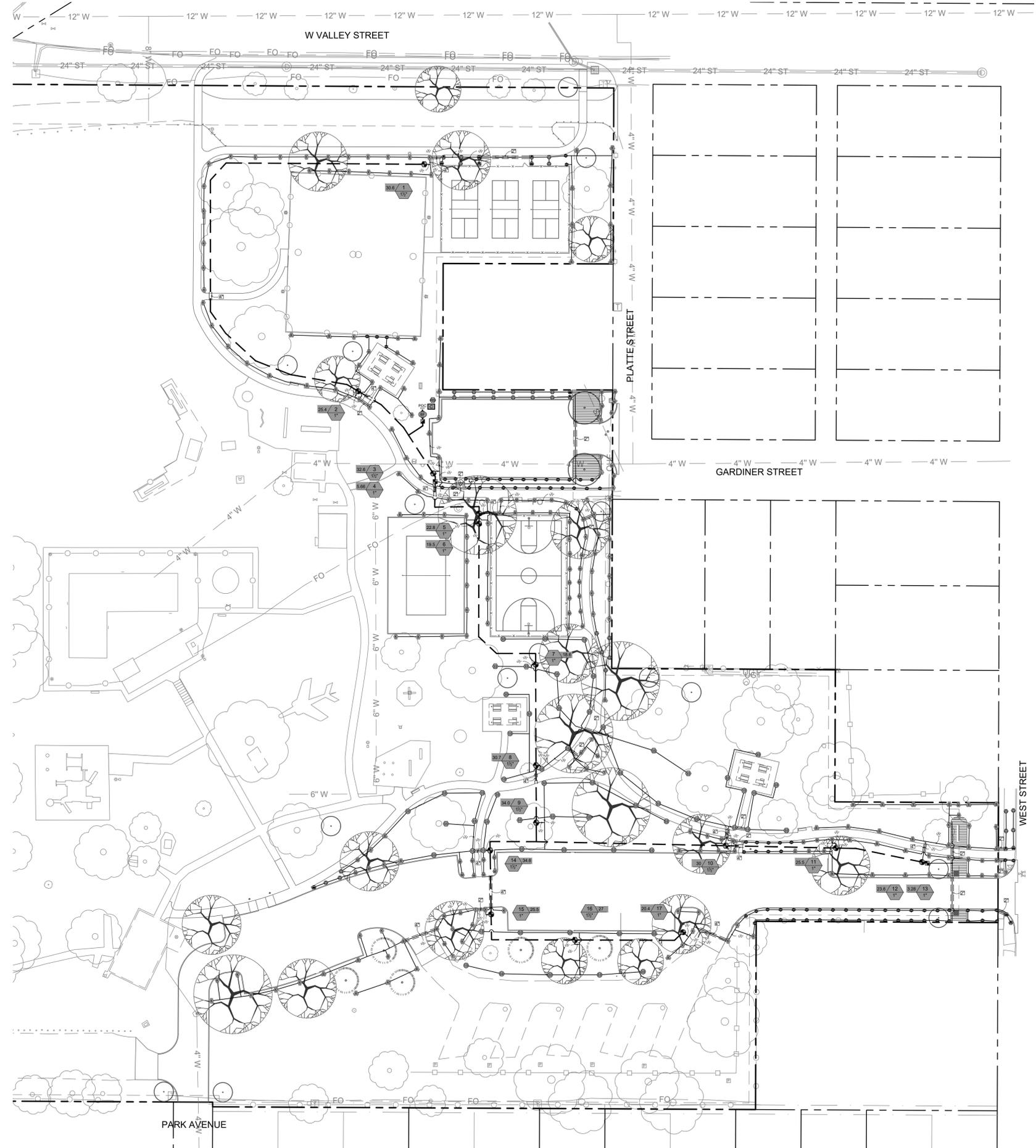


REVISIONS

A1 ADDENDUM 1	05/29/24
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DATE: 05/15/2024
 PROJECT NO.: 221849.01
 DRAWN BY: JH
 REVIEWED BY: TJ

SITE EROSION CONTROL PLAN



SITE IRRIGATION PLAN

IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL	QTY
	HUNTER MP 800SR PROS-04-PRS40-CV	85
	HUNTER MP CORNER PROS-04-PRS40-CV	9
	HUNTER MP STRIP PROS-04-PRS40-CV	41
	HUNTER MP 1000 PROS-04-PRS40-CV	76
	HUNTER MP 2000 PROS-04-PRS40-CV	96
	HUNTER MP 3000 PROS-04-PRS40-CV	58
	HUNTER I-20-04 1.5	12
	HUNTER I-20-04 3.0	36
	HUNTER I-20-04-LA 2.5	2
	HUNTER I-20-04-LA 3.5	10
	HUNTER PCZ-101-40 1"	2
	AREA TO RECEIVE DRIPLINE PROTRADE PT-DL17-0612CV (18)	892.9 L.F.
	HUNTER PGV-101G 1"	8
	HUNTER PGV-151 GLOBE 1-1/2"	7
	HUNTER HQ-5RC 1"	1
	FEBCO 825Y 1-1/2"	1
	GREENTECH CA6-HU4-75/A2CEN/GTCM-5Y W/ EMP-16 PLEASE CALL 402.679.1803 FOR INFORMATION	1
	GREENTECH RSP PLEASE CALL 402.679.1803 FOR INFORMATION	1
	POC PLEASE CALL 402.679.1803 FOR INFORMATION	1
	IRRIGATION LATERAL LINE: POLYETHYLENE PIPE 80 PSI 1"	6,737 L.F.
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21 1 1/2"	507.5 L.F.
	IRRIGATION MAINLINE: PVC CLASS 200 SDR 21 2"	1,426 L.F.
	PIPE SLEEVE: PVC SCHEDULE 40 2"	179.9 L.F.
	PIPE SLEEVE: PVC SCHEDULE 40 4"	135.5 L.F.

IRRIGATION NOTES

- IRRIGATION SYSTEM DESIGN BASED ON 35 GPM AT 65 PSI.
- IRRIGATION DESIGN IS FROM THE POINT OF CONNECTION (POC) ONLY. THE DESIGN IS BASED ON GALLONS PER MINUTE (GPM) AND POUNDS PER SQUARE INCH (PSI) FURNISHED BY OTHERS.
- IRRIGATION CONTRACTOR IS TO VERIFY POINT OF CONNECTION IN THE FIELD. INSTALLER IS TO CONFIRM THE MINIMUM DISCHARGE REQUIREMENTS OF THE POINT OF CONNECTION AS INDICATED ON THE LEGEND PRIOR TO INSTALLATION.
- THE PRESSURE REQUIREMENT AT THE POINT OF CONNECTION IS BASED ON NO MORE THAN 5-FEET OF ELEVATION CHANGE IN THE AREAS OF IRRIGATION.
- ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ACCORDING TO LOCAL BUILDING, ELECTRICAL AND PLUMBING CODES.
- IRRIGATION CONTRACTOR WILL ARRANGE INSPECTIONS REQUIRED BY LOCAL AGENCIES AND ORDINANCES DURING THE COURSE OF CONSTRUCTION AS REQUIRED. ALL WIRING TO BE PER LOCAL CODE. BACKFLOW PREVENTION PER LOCAL CODE.
- LOCATION OF IRRIGATION COMPONENTS SHOWN ON DRAWINGS IS APPROXIMATE. ACTUAL PLACEMENT MAY VARY SLIGHTLY AS REQUIRED TO ACHIEVE FULL, EVEN COVERAGE.
- ALL SPRINKLER HEADS SHALL BE INSTALLED PERPENDICULAR TO FINISH GRADES, EXCEPT AS OTHERWISE INDICATED.
- INSTALL IRRIGATION MAINS WITH A MINIMUM 18" OF COVER BASED ON FINISH GRADES. INSTALL IRRIGATION LATERALS WITH A MINIMUM 12" OF COVER BASED ON FINISH GRADES.
- PIPE LOCATIONS ARE DIAGRAMMATIC. VALVES AND MAINLINE SHOWN IN PAVED AREAS ARE FOR GRAPHIC CLARITY ONLY.
- THE IRRIGATION CONTRACTOR SHALL COMPLY WITH PIPE SIZES AS INDICATED.
- THE FOLLOWING SHOULD BE NOTED REGARDING TO PIPE SIZING: IF A SECTION OF UN-SIZED LATERAL PIPE IS LOCATED BETWEEN TWO IDENTICALLY SIZED SECTIONS THE UN-SIZED SECTION SHALL BE OF THE SAME SIZE. IF A SECTION OF UN-SIZED LATERAL PIPE IS NOT SIZED AT THE END OF A ZONE AND IS NOT BETWEEN TWO IDENTICALLY SIZED SECTIONS THE UN-SIZED SECTION(S) SHALL BE 1-INCH.
- ALL WIRE SPLICES OR CONNECTIONS SHALL BE MADE WITH APPROVED WATERPROOF WIRE CONNECTORS AND BE IN A VALVE OR SPLICE BOX.
- ALL CONTROL WIRING DOWNSTREAM OF THE CONTROLLER IS TO BE SINGLE STRAND 14 GAUGE RED AND WHITE, UL APPROVED DIRECT BURY.
- THE DESIGN IS BASED ON THE SITE INFORMATION AND/OR DRAWING SUPPLIED WITH THE DESIGN CRITERIA BEING SET (AREA TO BE IRRIGATED, EQUIPMENT MANUFACTURER AND MODEL TO BE USED, WATER SOURCE INFORMATION, ELECTRICAL POWER AVAILABILITY, ETC.). SITEONE LANDSCAPE SUPPLY BEARS NO RESPONSIBILITY OR LIABILITY FOR ANY ERRORS IN DESIGN OR INSTALLATION THAT ARISE DUE TO INACCURACIES IN THE ABOVE REFERENCED INFORMATION SUPPLIED TO SITEONE LANDSCAPE SUPPLY IN RELATION TO THIS PROJECT, UNLESS OTHERWISE NOTED.



2024
 CITY OF VALLEY
 VALLEY CITY PARK - PHASE 1 RENOVATIONS
 VALLEY, NE



REVISIONS

A1 ADDENDUM 1	05/29/24
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DATE: 05/15/2024
 PROJECT NO.: 221849.01
 DRAWN BY: JH
 REVIEWED BY: TJ

SITE IRRIGATION PLAN



Sign-in Sheet for All Attendees at Pre-bid Conference

DATE | May 23, 2024

PROJECT | Valley City Park - Phase 1 Renovations

JEO PROJECT NO. | 221849.01

LOCATION | Valley, Nebraska

CONFERENCE LOCATION | Valley City Park at W Vass Street, Valley, Nebraska

Name	Title	Agency/Company	Email	Phone/Mobile
DAN BAILEY	SUPERINTENDENT	JMN. CONSTRUCTION	DBAILEY@JMNCONSTRUCTIONLLC.COM	402-657-0940
MJ NACHREINER	PROJECT ENGINEER	JMN CONSTRUCTION	mnachreiner@jmnconstructionllc.com	402-616-7790
Tim Vierregger	ESTIMATOR	VIERREGGER ELEC	T4acres@AOL.COM	402 306-4960
Tom Gurnon	PM	Elkhorn West Const.	Tom@elkhornwest.com	402-315-9557
Scott Hightower	PM	Midwest Excavating Services	shightower.mes@outlook.com	402-679-1581
Jon Henne	President	Meco-Henne	estimating@mecohenne.com	402-510-0835
RYAN BORER	ESTIMATOR	VALLEY CORP.	rborer@valleycorp.com	402-957-7573
Cole Carlovic	President	Carlovic Excavating	Cole@carlovicexcavating.com	402-290-4472
Bodie Dostal	President	Dostals Const	bodie.dostal@hotmail.com	402-670-8506
Kasey Schweers	President	Electricians Inc.	electriciansinc@gmail.com	402-983-5151
Kyle Boettger	Designer	Sprinkler Irrigation Services	Kb@sprinklerirrigationservice.com	531-800-4240

**PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR
VALLEY CITY PARK - PHASE 1 RENOVATIONS
FOR
VALLEY, NE**

ADDENDUM NO. 2

June 10, 2024

TO: PLANS, SPECIFICATIONS AND BIDDING DOCUMENTS FOR THE VALLEY CITY PARK - PHASE 1 RENOVATIONS (JEO PROJECT NO. 221849.01).

NOTICE:

THIS ADDENDUM IS ISSUED BY JEO CONSULTING GROUP, INC. TO ALL KNOWN INDIVIDUALS, FIRMS OR CORPORATIONS WHO HAVE OBTAINED OR RECEIVED BIDDING DOCUMENTS AND CONTRACT DOCUMENTS FOR ABOVE LISTED PROJECT.

THIS ADDENDUM IS HEREBY MADE A PART OF THE BIDDING DOCUMENTS OR CONTRACT DOCUMENTS, AS APPROPRIATE. BIDDERS ARE REQUIRED TO ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN APPROPRIATE SPACE ON THE BID FORM.

CHANGES TO PROJECT SPECIFICATIONS:

1. Refer to Section 00 01 10 - Table of Contents in front of Specifications.

Amend the Contents to include the following Section: '01 21 00 – Allowances'

The Specifications shall also be amended to include the referenced section, which is attached to this addendum.

2. Refer to Section 00 41 00 – Bid Form.

Delete paragraph 1.10 BID FORM SUPPLEMENTS in its entirety.

The Specifications shall also be amended to include the referenced section, which is attached to this addendum.

3. Refer to Section 01 40 00 – Quality Requirements.

Amend Paragraph 1.05.A to read as follows:

Contractor will employ services of a testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.

The Specifications shall also be amended to include the referenced section, which is attached to this addendum.

4. Refer to Section 03 30 00 – Cast-in-Place Concrete.

Delete paragraph 3.10.A in its entirety.

The Specifications shall also be amended to include the referenced section, which is attached to this addendum.

5. Refer to Section 32 13 13 – Portland Cement Concrete Paving.

The entire section shall be deleted and replaced with the attached revised Section 32 13 13 - Portland Cement Concrete Paving section.

The Specifications shall also be amended to include the referenced section, which is attached to this addendum.

CLARIFICATIONS:

1. In reference to detail 10 on plan sheet C602 – Base aggregate and leveling aggregate should be defined by engineer responsible for detailing the post-tensioned concrete for courts.
2. Alternate and Unit Price lines are provided on the Bid Form.

All other requirements of the Plans, Specifications and Contract Documents remain in effect. This addendum shall be attached to and made a part of the Plans, Specifications and Contract Documents and receipt shall be acknowledged by the Bidder on the Proposal submitted.

END OF ADDENDUM NUMBER 1



Jon Hauck
June 10, 2024

**SECTION 00 01 10
TABLE OF CONTENTS**

PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

- 00 01 07 - Seals Page
- 00 01 10 - Table of Contents
- 00 01 15 - List of Drawing Sheets
- 00 11 13 - Advertisement for Bids
- 00 21 13 - Instructions to Bidders
- 00 41 00 - Bid Form
- 00 52 00 - Agreement Form
- 00 72 00 - General Conditions
- 00 73 00 - Supplementary Conditions

SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

- 01 20 00 - Price and Payment Procedures
- 01 21 00 - Allowances
- 01 22 00 - Unit Prices
- 01 23 00 - Alternates
- 01 30 00 - Administrative Requirements
- 01 32 16 - Construction Progress Schedule
- 01 40 00 - Quality Requirements
- 01 50 00 - Temporary Facilities and Controls
- 01 60 00 - Product Requirements
- 01 70 00 - Execution and Closeout Requirements
- 01 78 00 - Closeout Submittals

DIVISION 02 -- EXISTING CONDITIONS (NOT USED)

DIVISION 03 – CONCRETE

- 03 30 00 – Cast-in-Place Concrete

DIVISION 04 – MASONRY

- 04 20 00 – Unit Masonry

DIVISION 05 – METALS

05 50 00 – Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, COMPOSITES

06 10 00 – Rough Carpentry

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 25 00 – Weather Barriers

07 62 00 – Sheet Metal Flashing and Trim

DIVISION 08 – OPENINGS (NOT USED)

DIVISION 09 – FINISHES (NOT USED)

DIVISION 10 – SPECIALTIES

10 75 00 – Flagpoles

DIVISION 11 -- EQUIPMENT (NOT USED)

DIVISION 12 – FURNISHINGS

12 93 00 – Site Accessories

DIVISION 13 – SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 -- CONVEYING EQUIPMENT (NOT USED)

DIVISION 22 – PLUMBING (NOT USED)

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (NOT USED)

DIVISION 26 -- ELECTRICAL

26 00 00 - Electrical Work

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY (NOT USED)

DIVISION 31 -- EARTHWORK

31 10 00 – Site Clearing

31 19 13 – Bioretention Soil

31 22 00 – Grading, Excavation and Embankment

- 31 23 13 – Subgrade preparation
- 31 23 23 – Fill and Backfill
- 31 23 33 – Trenching for Site Utilities
- 31 25 00 – Erosion Control

DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 13 13 – Portland Cement Concrete Paving
- 32 13 13.20 – Post-Tensioned Concrete for Courts
- 32 14 13 – Precast Concrete Unit Paving
- 32 15 00 – Aggregate Surfacing
- 32 17 23 – Pavement Marking
- 32 17 26 – Tactile Warning Surfacing
- 32 18 23.53 – Acrylic Color Surfacing for Post-Tensioned Courts
- 32 31 13 – Chain Link Fences and Gates
- 32 31 13.30 – Pickleball Court Equipment
- 32 32 73 – Joint Sealers
- 32 84 00 – Underground Sprinkler System
- 32 92 00 – Turf and Grasses
- 32 93 00 – Plant Materials

DIVISION 33 -- UTILITIES (NOT USED)

**SECTION 00 41 00
BID FORM**

THE PROJECT AND THE PARTIES

1.01 TO:

City of Valley
203 N Spruce Street
Valley, NE 68064

1.02 FOR:

Valley City Park – Phase 1 Renovations

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

- A. Bidder's Full Name _____
1. Address _____
2. City, State, Zip _____

1.05 OFFER

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by JEO Consulting Group, Inc., Project No. 221849.01 for the above-mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

- B. Base Bid Price: _____
_____ dollars

(\$ _____), in lawful money of the United States of America.

1. We have included the required security Bid Bond as required by the Instruction to Bidders.
2. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.

- C. Alternates: See section 01 23 00 Alternates.

1. **Alternate 1** – North Parking Lot
(deduct) _____ dollars

2. **Alternate 2** – Pickleball Court Lighting
(add) _____ dollars

3. **Alternate 3** – Shelter Lighting and Power
(add) _____ dollars

D. Unit Prices: See Section 01 22 00

1. **Unit Price No. 1** – Unsuitable Material Below Exposed Subgrade.

_____, \$ _____/CY)

2. **Unit Price No. 2** – Place and finish additional 5” concrete pavement and subgrade preparation.

_____, \$ _____/SF)

1.06 ACCEPTANCE

- A. This offer shall be open to acceptance and is irrevocable for forty-five days from the bid closing date.
- B. If this bid is accepted by Owner within the time period stated above, we will:
 - 1. Execute the Agreement within seven days of receipt of Notice of Award.
 - 2. Furnish the required bonds within seven days of receipt of Notice of Award.
 - 3. Commence work within seven days after written acceptance of this bid of this bid.
- C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
- D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

- A. If this Bid is accepted, we will complete the work by: _____(Bidder to enter date)

1.08 CHANGES TO THE WORK

- A. When Architect establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee will be:
 - 1. 10 percent overhead and profit on the net cost of our own Work;
 - 2. 10 percent on the cost of work done by any Subcontractor.
- B. On work deleted from the Contract, our credit to Owner shall be Architect-approved net cost plus 50 percent of the overhead and profit percentage noted above.

1.09 ADDENDA

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
 - 1. Addendum # _____ Dated _____.
 - 2. Addendum # _____ Dated _____.
 - 3. Addendum # _____ Dated _____.

1.10 BID FORM SIGNATURE(S)

- A. The Corporate Seal of
- B. _____
- C. (Bidder - print the full name of your firm)
- D. was hereunto affixed in the presence of:
- E. _____
- F. (Authorized signing officer, Title)
- G. (Seal)
- H. _____
- I. (Authorized signing officer, Title)

END OF SECTION

**SECTION 01 21 00
ALLOWANCES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Inspecting and testing allowances.
- C. Payment and modification procedures relating to allowances.

1.02 RELATED REQUIREMENTS

- A. Section 01 20 00 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

- A. Costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts , less applicable taxes .

1.04 INSPECTING AND TESTING ALLOWANCES

- A. Costs Included in Inspecting and Testing Allowances: Cost of engaging an inspecting or testing agency; execution of inspecting and tests; and reporting results.
- B. Costs Not Included in the Inspecting and Testing Allowances:
 - 1. Costs of incidental labor and facilities required to assist inspecting or testing agency.
 - 2. Costs of testing services used by Contractor separate from Contract Document requirements.
 - 3. Costs of retesting upon failure of previous tests as determined by Architect.
- C. Payment Procedures:
 - 1. Submit one copy of the inspecting or testing firm's invoice with next application for payment.
- D. Differences in cost will be adjusted by Change Order.

1.05 ALLOWANCES SCHEDULE

- A. Testing Allowance: Include the sum of \$10,000.00 for testing compacted soils specified in Section 31 23 23 and concrete specified in 32 13 13.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Submittals.
- C. References and standards.
- D. Control of installation.
- E. Tolerances.
- F. Testing and inspection agencies and services.
- G. Control of installation.
- H. Tolerances.
- I. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Document 00 31 00 - Available Project Information: Soil investigation data.
- B. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.
- C. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- D. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- E. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents, or for Owner's information.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.

- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.04 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor will employ services of a testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.

- b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
- c. To facilitate tests/inspections.
- d. To provide storage and curing of test samples.
- 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 03 30 00
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete topping on structural stoops.
- C. Floors and slabs on grade.
- D. Concrete foundation walls.
- E. Concrete reinforcement.
- F. Joint devices associated with concrete work.
- G. Miscellaneous concrete elements, including equipment pads.
- H. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: for procedural requirements for testing of concrete.
- B. Section 03 35 11 - Concrete Floor Finishes
- C. Section 07 90 05 - Joint Sealers.
- D. Section 32 13 13 - Concrete Paving: for exterior concrete.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2006.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.
- G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).
- H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.
- J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.
- K. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- L. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- M. ASTM C 33 - Standard Specification for Concrete Aggregates; 2007.
- N. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2005.

- O. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.
- P. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2008.
- Q. ASTM C 150 - Standard Specification for Portland Cement; 2007.
- R. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.
- S. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2008a.
- T. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.
- U. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.
- V. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.
- W. ASTM E1155 Standard Test Method for Determining *FF* Floor Flatness and *FL* Floor Levelness Numbers"

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.
- C. Design Mixes: For each concrete mix, include mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.
 - 1. Indicate amounts of mix water to be withheld for later addition at project site.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates
 - 2. Steel reinforcement and reinforcement accessories
 - 3. Admixtures
- E. Shop Drawings - Steel Reinforcement: Details of fabrication, bending, and placement prepared according to ACI 315.
 - 1. Included material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement and supports of concrete reinforcement.
 - 2. Include special reinforcement required for openings through concrete structures.
- F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Installer Qualifications: An experienced installer who has completed concrete work 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.
- E. Manufacturer's Qualifications: Firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association Certification of Ready Mixed Concrete Production Facilities.
- F. Testing Agency Qualifications: Independent testing agency acceptable to authorities having jurisdiction qualified according to ASTM C 1077 and ASTM E 329 to conduct testing indicated as documented according to ASTM E 548.

- G. Obtain each type or class of cementitious material of the same brand from the same source, aggregate from same source, and each admixture from same source.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Avoid damaging coatings on steel reinforcement.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.
 - 1. Exposed finished concrete surfaces shall be formed using plywood, metal or other approved panel material. Provide continuous, straight, smooth, exposed surfaces and furnish forms in largest possible sizes to minimize the number of joints and that conform to joint system shown on plans.
 - a. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form, Class 1"
 - b. Use of aluminum forms is allowed.
 - 2. Unexposed finished concrete surfaces shall be formed using plywood, metal or other approved panel material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
 - a. Use of aluminum forms is prohibited.
 - 3. Form Coatings shall be commercial formulation foam-coating compounds with a minimum VOC of 350 mg/L that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - a. For steel forms, formulate form-release agent with rust inhibitor.
 - 4. Form Ties shall be factory fabricated, adjustable length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling concrete upon removal.
 - a. Provide ties that will leave no metal closer than 1-1/2 inches to exposed surface.
 - b. Provide ties that will leave holes no larger than 1 inch diameter in concrete surface.
 - 5. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 6. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420), deformed.
- B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
 - 1. Fabricated from as-drawn steel wire into flat sheets. Rolled sheets not permitted
- C. Reinforcement Accessories:
 - 1. Chairs, Bolsters, Bar Supports, Spacers and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Sized and shaped for adequate support of reinforcement during concrete placement.
 - 2. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type I or Type III Portland Cement.
 - 1. Acquire all cement for entire project from same source, type, and brand.
 - 2. Cement may be supplemented with Fly Ash: ASTM C 618, Class C.
- B. Normal-weight Aggregates: ASTM C 33, graded, 3/4 inch and 1-1/2 inch nominal maximum coarse-aggregate size.

- C. Fine Aggregates: Free of materials with deleterious reactivity to alkali in cement.
 - 1. Acquire all aggregates for entire project from same source.
- D. Water: Clean and not detrimental to concrete. ASTM C 94 and potable.

2.04 CHEMICAL ADMIXTURES

- A. Provide admixtures certified by manufacturer to be compatible with other admixtures. Do not use calcium chloride or admixtures containing calcium chloride.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C 260.
- D. High Range Water Reducing and Retarding Admixture: ASTM C 494/C 494M Type G.
- E. High Range Water Reducing Admixture: ASTM C 494/C 494M Type F.
- F. Water Reducing and Retarding Admixture: ASTM C 494/C 494M Type D.
- G. Retarding Admixture: ASTM C 494/C 494M Type B.
- H. Water Reducing Admixture: ASTM C 494/C 494M Type A.
- I. Plasticizing and Retarding Admixture: ASTM C 1017, Type II
- J. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1 to 1-1/2 inches long.

2.05 ACCESSORY MATERIALS

- A. Vapor Barrier Membrane must meet the following requirements.
 - 1. Maintain permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 15 mils minimum
 - c. Water Vapor Permeance: ASTM F1249, 0.0086 perms
 - d. Puncture Resistance: ASTM D1709, 2,266 grams
 - e. Tensile Strength: ASTM D882, 70.6lbf/in.
 - 3. Acceptable Manufacturers:
 - a. Stego Wrap 15-mil Vapor Barrier by STEGO INDUSTRIES, LLC., San Juan Capistrano, CA (877) 464-7834, www.stegoindustries.com.
 - b. Premoulded Membrane with Plasmatic Core by W.R. Meadows, Hampshire, IL (847)214-2100, www.wrmeadows.com.
 - c. Zeroperm by Alumiseal, Hanover, MA (781) 261-9991.
 - d. Viper II 15-mil Vapor Barrier, by Insulation Solution, Inc.
 - 4. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated pipe boots, etc., for sealing seams and penetrations in vapor retarder.
 - a. Water vapor transmission rate of 0.3 Perms or lower as per ASTM E 96.

2.06 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable

- E. Clear, Waterborne, Membrane-forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A, exterior applications

2.07 RELATED MATERIALS

- A. Expansion- and Isolation-Joint Filler Strips: Sonneborn Sonoflex F or equal.
- B. Granular Fill: Nebraska Department of Roads 47B Sand Gravel Mix as identified within the Geotechnical Exploration Report. (See specification Section 00 31 00 - Available Project Information)
- C. Patching compound: Cement-based compound for applications from one inch thick to feathered edge.
- D. Bonding Compound: Polyvinyl acetate or acrylic base.

2.08 CONCRETE MIX DESIGN

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportioning Normal Weight Concrete Mixture for interior slabs-on-grade:
 - 1. Minimum compressive strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- C. Proportioning Normal Weight Concrete Mixture for foundation walls as follows:
 - 1. Minimum compressive Strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.
- D. Proportioning Normal Weight Concrete Mixture for footings as follows:
 - 1. Minimum compressive Strength: 3,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.53.
 - 4. Fly ash or other pozzolans not to exceed 25 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: 6 percent plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.
- E. Proportioning Normal Weight Concrete Mixture for concrete topping on structural stoops as follows:
 - 1. Minimum compressive Strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.

5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
6. Air Content: 6 percent plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.

2.09 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to the Concrete Reinforcing Steel Institute's (CRSI) "Manual of Standard Practice."

2.10 MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and furnish batch ticket information.
 1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes. When air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
 1. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated within tolerance limits of ACI 117.
 - a. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses and the like for easy removal.
 - b. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
 - c. Chamfer exterior corners and edges of permanently exposed concrete.
 - d. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris before placing concrete.
 - e. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
 - f. Verify that forms are clean and free of rust before applying release agent. Coat contact surfaces of forms with form-releasing agent according to manufacturer's directions before placing reinforcement.
- B. Embedded Items: Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor bolts, accurately located, to elevations required.
- C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

3.03 INSTALLING REINFORCEMENT

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
 1. Do not cut or puncture vapor barriers. repair damage and reseal vapor retarder before placing concrete.

- B. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by bolsters, chairs, or other devices to maintain minimum concrete cover. Do not secure reinforcement to re-bar driven into ground or on rocks, dirt clods, or other debris. Do not "float in" reinforcement.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete not toward exposed concrete surfaces.
- D. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire. Rolled stock is not permitted.
 - 1. Lap edges and ends of adjoining sheets at least one full mesh spacing and lace splices with tie wire.
 - 2. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

3.04 PREPARATION AT TOPPING AREAS

- A. At concrete areas designated to receive cast-in-place concrete toppings, ensure surface is clean and free of debris.
- B. Apply bonding compound at manufacturer's recommended rate immediately before placing concrete (or as recommended by manufacturer).

3.05 JOINT PLACEMENT

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install diamond dowels per structural details so strength and appearance of concrete are not impaired at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness and at a maximum length to width ratio of 1.25 and as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations as indicated.
 - 1. Extend joint filler strips full width and depth of joint terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants are indicated.
 - 3. Install joint-filler strips in lengths as long as practical. Where more than one length is required, lace or clip sections together.
- E. Dowel Joints: Install diamond dowel sleeves and dowel support assemblies at joints where indicated. Use dowel sleeves or lubricate or asphalt-coat 1/2 of dowel length to prevent concrete bonding to 1 side of joint.
- F. Water Stops: Install flexible water stops in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practical. Support and protect exposed water stops during progress of work. Field Fabricate joints in water stops according to manufacturer's instructions.
- G. Provide joint fillers and sealant at all isolation and expansion joints but not at contraction joints.

- H. At concrete toppings, tool or sawcut control joints immediately over existing joints. If existing concrete is cracked, install joints on lines parallel and perpendicular to the building as close to the crack locations as possible.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Cold-weather Placement: Comply with ACI 306.1
- D. Hot-weather Placement: Comply with ACI 305R.
- E. Before placing concrete, ensure installation of formwork, reinforcement, embedded parts, formed construction joint devices, and vapor barriers is complete and will not be disturbed during concrete placement.
- F. Before placing concrete, verify that all required inspections have been performed.
- G. Repair under slab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- H. Install joint devices in accordance with manufacturer's instructions.
- I. Deposit concrete continuously or in layers at such thickness that no concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
 - 1. Concrete free fall distance shall not exceed 5 feet. This includes free fall in a discharge pipe. Chute and tremie pipes may be used for conveying concrete to the forms when authorized by the Architect.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- J. Deposit concrete in forms in horizontal layers no deeper than 18 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.
- K. Deposit and consolidate concrete for floors and slabs in continuous operation within limits of construction joints until placement of panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drain where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-texture surface plane, free of humps or hollows, before excess moisture or bleed water appears on surface. Do not further disturb slab surfaces before starting finishing operations.
- L. Screed floors level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
 3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Re-straighten, cut down high spots and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - a. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing.
 2. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - a. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic, or quarry tile set over a cleavage membrane, paint, or another thin-film finish coating system.
 - b. Finish and measure surface to conform to *FF* 50, - *FL* 50 tolerances, very flat for areas to received polished concrete finish. Refer to Section 03 35 11, Concrete Floor Finishes.
 3. Trowel and Fine-Broom Finish: Apply a first trowel finish to pavement surfaces. While concrete is still plastic, slightly scarify surface with a fine broom.
 - a. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
 4. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 5. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
 6. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days.
 2. Moisture Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete placed in widest practicable width with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Cure for not less than 7 days. 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.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer

unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
5. a. Product: L&M Cure 'R' as manufactured by L&M Chemicals
- C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finish.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces by one of the methods listed above in formed surfaces.
 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.

3.09 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's directions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints. Leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy joint filler depth in saw-cut joints and at least 2 inches into deep-formed joints. Overfill joint and trim joint filler flush with lip of joint after hardening.

3.10 FIELD QUALITY CONTROL

- A. Provide free access to concrete operations at project site and cooperate with appointed firm.
- B. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- C. Compressive Strength Tests: ASTM C 39/C 39M. For each day's pour, mold and cure four concrete test cylinders. Obtain test samples for every 50 cu yd thereafter, or less for each class of concrete placed. One specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 1. Strength of each concrete mix will be satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- D. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- E. Perform one slump test, following procedures of ASTM C 143/C 143M, at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
- F. Perform air content tests for each day's pour of each type of air-entrained concrete.
 1. ASTM C 173 - volumetric method for lightweight or normal weight concrete
 2. ASTM C 231 - pressure method for normal weight concrete
- G. Report test results in writing to Owner, Architect, Structural Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests.

- H. 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 be met. Conduct tests by core cylinders complying with ASTM C 42 or other methods as directed by the Architect.
- I. Concrete Trucks shall not be rinsed on Owner's property nor on adjacent property.

3.11 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades. Mix, place, and cure concrete to blend with in-place construction.
- D. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and slope using a template. Correct low and high areas as herein specified.
 - 1. Repair finished unformed surfaces that contain defects that affect durability of concrete, reinforcement, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
 - 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 3. Correct low areas in unformed surfaces by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete.
 - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type of class as original concrete. Place, compact, and finish to blend with adjacent finished concrete.

END OF SECTION

SECTION 32 13 13
PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Concrete roads, streets, sidewalks, trails, curb ramps, curb and gutter, driveways, alleys and parking areas.

1.02 REFERENCES

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- B. ACI 301 - Specifications for Structural Concrete for Buildings
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete
- D. ACI 305R – Guide for Hot Weather Concreting
- E. ACI 306R – Guide to Cold Weather Concreting
- F. ASTM A 185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013).
- G. ASTM A 497 – Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete (Withdrawn 2013).
- H. ASTM A 615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- I. ASTM C 33 – Standard Specification for Concrete Aggregates.
- J. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C 94 – Standard Specification for Ready-Mixed Concrete.
- L. ASTM C 150 – Standard Specification for Portland Cement.
- M. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- N. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- O. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- P. ASTM C 311 – Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.
- Q. ASTM C 494 – Standard Specification for Chemical Admixtures for Concrete.
- R. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- S. ASTM C 685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
- T. ASTM C 1074 – Standard Practice for Estimating Concrete Strength by the Maturity Method.

- U. ASTM C 1116 – Standard Specification for Fiber-Reinforced Concrete.
- V. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- W. ASTM D 1752 – Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete paving and Structural Construction.
- X. ASTM D 3405 – Standard Specification for Joint Sealants, Hot-Applied for Concrete and Asphalt Pavements (Withdrawn 2002).
- Y. AASHTO M 33 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- Z. AASHTO M 148 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- AA. State Standard Specifications for Highway Construction, Latest Addition, including all current supplemental specifications.

1.03 SUBMITTALS

- A. Submit the proposed mix design for each class of concrete to Engineer and testing firm for review prior to commencement of concrete operations.
- B. Submit information on any proposed additives for the mix design.
- C. Submit information on reinforcement for baskets, special design, etc.
 - 1. Included material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement and supports of concrete reinforcement.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.

1.04 QUALITY ASSURANCE

- A. Obtain cementitious materials, aggregate and each admixture from same source throughout.
- B. Concrete Supplier Qualifications: Firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Concrete Supplier must be certified according to the National Ready Mixed Concrete Association Certification of Ready Mixed Concrete Production Facilities.
- C. Testing Agency Qualifications: Independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct testing indicated, as documented according to ASTM E 548.
- D. Follow recommendations of the applicable State or Local Standard Specifications, and ACI 306R, when placing concrete during hot or cold weather.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Reference: Applicable State or Local Standard Specifications.

- B. Do not place concrete when base surface temperature is less than 40 degrees F or surface is unstable or frozen.
- C. Do not start to place concrete until ascending ambient air temperature reads 41 degrees F.
- D. Cease placing operations when descending ambient air temperature reaches 41 degrees F.
- E. Protect concrete when the air temperature may be expected to drop below 36 degrees F.
- F. Any concrete damaged by freezing will be rejected. Removal and replacement at Contractor's expense.
- G. When evaporation rate approaches 0.2 lb/sf/h, Contractor must notify Engineer regarding the actions to be taken to prevent plastic shrinkage cracking. Obtain rate of evaporation using nomograph, applicable State or Local Standard Specifications.

1.06 METHOD OF CONSTRUCTION

- A. Full Width, Slip Form Paving Machines:
 - 1. Required method of main line paving.
 - 2. Reference: Applicable State or Local Standard Specifications.
 - 3. Exceptions to Full Width Paving:
 - a. Intersection returns.
 - b. Driveways and parking area.
 - c. Irregular shapes.
 - d. Sidewalks.
 - e. Areas designated in the drawings to be constructed in phases in order to provide access to property.
- B. Paving Less Than Full Width:
 - 1. Restrictions:
 - a. No equipment is allowed within 3 feet of the edge of freshly poured concrete paving for a minimum of 3 days.
 - b. No concrete trucks, pumping machines, paving machines, conveyors or related equipment used to transport or place concrete shall be allowed on new paving for a minimum of 7 days and concrete has developed a compressive strength of 3,500 psi.
 - 2. Additional Costs:
 - a. If approved by Owner and Engineer, Contractor shall be responsible for additional costs related to paving less than full width on main line paving areas.
 - b. If approved by Owner and Engineer, Contractor shall make payment to Owner an amount equal to 5.0 percent of the total bid for square yards of concrete paving as submitted to compensate for the additional time involved. This payment shall be made to Owner prior to final payment of the completed project.

- c. Additional costs include:
 - (i) Construction staking.
 - (ii) Construction observation by resident project representative (RPR) and/or Engineer.
 - (iii) Construction Administration.
 - (iv) Additional compaction testing of subgrade.
 - (v) Additional concrete testing.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: Conform to applicable State or Local Standard Specifications.

2.02 REINFORCEMENTS

- A. Tie Bars: New, deformed billet-steel bars, Grade 60, ASTM A 615.
- B. Dowel Bars: New, smooth, round steel bars, Grade 60, ASTM A 615 coated with organic coating AASHTO M 254, corrosion resistant coated dowel bars.

2.03 CONCRETE MATERIALS

- A. Concrete Materials: As specified in applicable State or Local Standard Specifications
- B. Cement:
 - 1. Type I, Type II, Type I/II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements.
 - a. Portland cement shall not contain more than 0.60 percent equivalent alkali.
 - b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and the total amount does not exceed 1 percent of the weight of Portland cement clinker.
 - 2. Interground and Blended Cement shall conform to the requirements in ASTM C 595 with the following additional requirements:
 - a. Interground/Blended cement Type IP
 - (i) Type IP(25) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 25%+/-2%
 - (ii) Type IP(20) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 20%+/-2%
 - b. Interground/Blended cement Type IT
 - (i) For SCMs, slag cement and limestone, the maximum replacement by weight shall be 40%. The manufacturer has a production tolerance of +2% from the proposed replacement.
 - (ii) For slag cement, the maximum replacement shall be 20% or less when incorporated into the final Interground/Blended cement.

- (iii) For limestone cement, the replacement range shall be from 5.1% to 10.0% when incorporated into the final Interground/Blended cement.
- C. Fine and Coarse Mix Aggregate:
 - 1. Mineral aggregates shall be crushed rock, broken stone, gravel, sand-gravel, coarse sand, fine sand, or a mixture of these materials composed of clean, hard, durable, and uncoated particle.
 - 2. Shall meet the requirements in ASTM C 33.
 - 3. Aggregates shall be free from injurious quantities of dust, soft or flaky particles, loams, alkali, organic matter, paper, wood, or other deleterious matter as determined by Engineer.
 - 4. Free of materials with deleterious reactivity to alkali in cement.
- D. Fly Ash: Class F, ASTM C 618 and ASTM C 311.
 - 1. The use of Class C Fly Ash is not acceptable in any concrete on this project.
- E. Water:
 - 1. Shall meet the requirements in ASTM C 94 and potable.
 - 2. Water shall be free from objectionable quantities of oil, acid, alkali, salt, organic matter, or other deleterious materials.
- F. Air-Entrainment Admixture: Shall meet the requirements of ASTM C 260.
- G. Other Chemical Admixtures:
 - 1. See applicable State or Local Standard Specifications
 - 2. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of concrete.
 - 3. Admixture shall not contain more than 1 percent of chlorides calculated as calcium chloride.

2.04 ACCESSORIES

- A. Joint Filler: Preformed, nonextruding, bituminous type, AASHTO M 33.
- B. Liquid Membrane-Forming Compounds for Curing Concrete: White pigmented, AASHTO M 148, Type 2.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge.
 - 2. Chairs, Bar Supports, Bolsters, Spacers, and other devices for spacing: Sized and shaped for adequate support of reinforcement during concrete placement.

2.05 CONCRETE MIX DESIGN

- A. Street and roadway paving, alleys, driveways, trails, curb and gutter and parking areas.
 - 1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
 - 2. Admixtures: Add approved admixture at rate recommended by manufacturer.
- B. Sidewalks:

1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
 2. Admixtures: Add approved admixture at rate recommended by manufacturer.
- C. Fountain / Splashpad
1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
 2. Slump: 0.75 inches – 4.00 inches (maximum slump may be exceeded by use of a water-reducer, high-range water reducer, or both. Any increase in slump must be pre-approved by Engineer).
 3. Maximum water-cement ratio: 0.42

2.06 MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix and deliver according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.
1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1 1/2 hours to 75 minutes. When air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.
- B. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1.5 minutes and not more than 5 minutes.
- C. Transit Mixers: Comply with ASTM C 94.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradient and elevation of base are correct.
- C. Review project site to coordinate construction activities.

3.02 SUBGRADE

- A. In compliance with requirements Section 01 10 00 - Special Provisions, subgrade preparation or subgrade stabilization section and the recommendations of the geotechnical report for subgrade preparation requirements.

3.03 PREPARATION

- A. Moisten subgrade to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete.
- C. Notify Engineer a minimum of 48 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damage to concrete.

- C. Place vertical joint filler in position and in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement as indicated in the plans.
- B. Keep reinforcement clean and free from foreign materials.
- C. Furnish and install suitable supports for all reinforcing steel and dowel bars.
- D. Tying Reinforcement:
 - 1. Tie reinforcing bars securely in place at all points where bars cross other reinforcing bars.
 - 2. Tie epoxy coated reinforcing bars with plastic coated ties.
 - 3. After tying epoxy coated reinforcing, perform holiday test. Repair any damaged epoxy coating. Retest.
- E. Lubricate dowel bars as shown in the plans.
 - 1. Lubricate to form a complete and continuous film over portion of bar being coated.
 - 2. Coating to be sufficient to break bond between dowel bars and concrete.
 - 3. Lubricant to have sufficient contrast with bar to be easily seen.
- F. Placement of Dowel Bars:
 - 1. Mid-depth of slab.
 - 2. Parallel with finished surface of slab.
 - 3. Parallel with centerline of roadway.
- G. Dowel Bar Placement:
 - 1. Baskets, or
 - 2. Approved mechanical inserters, or
 - 3. Free end of dowels supported in a frame to properly maintain alignment.
- H. Longitudinal Tie Bar Placement:
 - 1. Support on bar pins, or
 - 2. Approved mechanical inserter.
- I. Longitudinal Tie Bar Placement in Key-Type Joint:
 - 1. Bend at 90 degrees at center to facilitate placement.
 - 2. Before placing adjacent slab, bend at 45 degrees to longitudinal joint.
 - 3. Replace bars that crack or break (see applicable State or Local Standard Specifications).
 - 4. Replace cracked or broken bars at no cost to Owner.

3.06 PLACING CONCRETE

- A. Construction methods in accordance with applicable State or Local Standard Specifications

- B. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Keep concrete manipulation to a minimum when bringing concrete to proper line and grade.
- E. Adjust forward speed of finishing machines so that operations are continuous and uninterrupted.
- F. Addition of water to the surface of the concrete to assist finishing operations is not allowed.
- G. Remove laitance and surplus water while concrete is still plastic.
- H. Test surface for smoothness and true to line and grade with 10-foot straightedge.
 - 1. Set parallel with centerline.
 - 2. Lap half-length on each successive position.
 - 3. Remove high areas, fill depressions and consolidate concrete with hand floats.
- I. Texture concrete over full width of surface in the longitudinal direction.
 - 1. Use wet burlap, carpet or canvas belt.
 - 2. Suspend drags with a mandrel or similar device to insure a uniform texture.
 - 3. Remove drag from surface of concrete when the paving train is not in motion 30 minutes or more.
 - 4. Rinse or wash drags as necessary to obtain a uniform surface.
 - 5. Replace drags which cannot be cleaned.
 - 6. Remove concrete over joints after final drag finish.
- J. Use edging tool to round joints and edges of concrete along the side forms.

3.07 JOINTS

- A. Align curb, gutter and sidewalk joints.
- B. Place preformed expansion joint materials as shown in the plans.
 - 1. Form joints with joint filler extending from the bottom of the concrete to within 1/2 inch of finished surface.
 - 2. Secure to resist movement while placing concrete.
- C. Provide keyed joints as shown in the plans.
- D. Construction Joints:
 - 1. Begin initial sawing when concrete can support the weight of the saw and sawing does not create raveling. Early entry or soft cut sawing will be allowed.
 - 2. Complete sawing before random cracking occurs.
 - 3. Cut each traverse joint in one continuous pass.

4. Discontinue sawing of joint if a crack occurs at or near the joint location before sawing or a crack develops ahead of the saw. Route these cracks to a depth of 1 1/2 inches and 0.4 to 0.6 inches wide and seal with joint sealers.
5. Any spalling of joints to be repaired in accordance with applicable State or Local Standard Specifications.

3.08 FINISHING

- A. Roads, Streets, Alleys and Parking Areas: Use wet burlap, carpet or canvas drag.
- B. Driveways and Sidewalks:
 1. New Concrete Abutting Existing Concrete: Match existing texture.
 2. New Construction: Steel floating with light broom finish.
- C. Trails:
 1. Use wet burlap, carpet or canvas drag; or float and light broom finish texture perpendicular to direction of travel.
 2. 1/4-inch radius edge and transverse cut joints.
- D. Curb Ramps:
 1. Meet minimum design standard in accordance with requirements of applicable State or Local Standard Specifications
 2. Float and light broom finish.
 3. Truncated Domes - Detectable Warning Panels
 4. Americans with Disabilities Act (ADA) approved detectable warnings.
- E. Splashpad
 1. Heavy broom finish
- F. Apply liquid membrane-forming compounds for curing concrete immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 JOINT SEALING

- A. Preparation:
 1. Seal joints according to manufacturer's recommendations.
 2. Clean joints prior to filling joints with joint sealer.
- B. Filling:
 1. Top surface of joint material to be approximately 1/4 inch below surface of concrete.
 2. Remove overflow material.
 3. Repair overfilled joints by reinstalling the joint filler.
- C. If adhesion is not satisfactory, the material will be removed and the joint cleaned and resealed at no cost to Owner.
- D. All joints will be sealed including joints between existing and new concrete.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/8 inch in 10 feet.
- B. Maximum Variation from True Position: 1/4 inch.
- C. All concrete shall meet or exceed the strength requirement of the specifications.

3.11 DEFECTIVE CONCRETE

- A. All materials which Engineer determines to be damaged, defective, or otherwise unsuitable for use will be rejected and shall be removed and replaced at Contractor's expense.
- B. Contractor will be required to take corrective measures for high spots by removal and replacement, or by grinding with a machine equipped with multiple diamond blades with spacers to the required profile. If grinding is used, utilize methods which do not break the cement and aggregate bond. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measure will be done at Contractor's expense.
- C. Contractor will be required to take corrective measures for low areas that pond water by removal and replacement of concrete or by grinding with a machine equipped with multiple diamond blades with spacers to the required profile. If grinding is used, utilize methods which do not break the cement - aggregate bond. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer and Owner approval prior to performing corrective measures. The approved corrective measure will be done at Contractor's expense.
- D. Contractor will be required to take corrective measures for any cracking of concrete no matter what the cause. The corrective measures may include routing and sealing the cracks or removal and replacement. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- E. Joints: Contractor will be required to take corrective measures for any joints that in the opinion of Engineer are not constructed per the plans and specifications. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- F. Contractor will be required to take corrective measures for any concrete containing excessive honeycombing, spalling, fractures, chips or other defects at no additional cost to Owner. The corrective measures may include repairing concrete or removal and replacement of concrete. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- G. Contractor must protect the concrete from damage due to rain, premature drying, excessive hot or cold temperatures, foot traffic and vehicular traffic. Failure to properly

protect concrete may constitute cause for repairing or for removal and replacement of defective concrete. Engineer will determine whether defective concrete shall be repaired, or if it shall be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan to address the defective concrete and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.

3.12 FIELD QUALITY CONTROL

- A. An independent testing agency employed by Contractor shall perform field quality control tests as specified in Section 01 40 00 - Quality Requirements.
1. Results of testing will be furnished in a timely manner to Owner, Engineer and Contractor, in writing.
 2. Contractor shall provide free access to concrete operations at project site and cooperate with testing agency.
 3. Contractor shall submit proposed mix design of each class of concrete to Engineer and testing agency for review at least 10 days prior to commencement of concrete operations.
 4. Field testing and laboratory testing of concrete will be performed by testing agency employed by Contractor to determine conformance with specified requirements.
 5. Strength Testing
 - a. Compressive Strength Test Samples: ASTM C 39. For each test, mold and cure 3 concrete test cylinders. A set of 3 test cylinders shall be collected for every 100 cubic yard or fractional part thereof for each class of concrete placed in a day. At least one set of cylinders is required for each day concrete placement takes place.
 - (i) One additional cylinder may be required for a break prior to 7 days.
 - (ii) Take 1 additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - b. Maturity Method for Estimating Strength: ASTM C 1074. The Contractor may elect to utilize the maturity curve method to determine concrete strength. The Contractor must notify the Engineer in writing and submit a Plan with any changes applicable with State or local standard specifications.
 6. Perform 1 slump test for each set of test cylinders taken.
 - a. If the concrete mixture is excessively wet causing segregation, excessive bleeding, or any other undesirable condition, the concrete shall be rejected.
 - b. If the slump is outside the allowable limits specified the load of concrete shall be rejected.
 7. Perform 1 air content test for each set of test cylinders taken.
 - a. If the air content is less than the minimum specified, only one addition of air-entraining admixtures is allowed.

- b. If the air content is then outside the allowable limits the load of concrete shall be rejected.
- B. The independent testing agency employed by Contractor will maintain records of placed concrete items and shall assist testing agency as necessary to accomplish the completion of this record keeping. Records will include; type of test samples taken, all test results, date and location of sample collected, concrete test cylinder number, quantity of concrete placed and slump, air content, air temperature test results.
- C. Additional Tests: The testing agency employed by Contractor shall make additional tests of concrete, as directed by Engineer, when test results indicate that slump, air entrainment, compressive strengths or other requirements have not been met.
 - 1. The cost for this additional testing will be paid for by Contractor.
 - 2. If any additional testing is required to isolate failures, this shall be considered retests and shall be paid for by Contractor.

3.13 PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, foot traffic, vehicular traffic and rain events.
- B. Do not permit pedestrian traffic over concrete for a minimum of 2 days after finishing.
- C. Do not permit vehicular traffic over concrete for a minimum of 7 days and after design strength of concrete has been achieved.

END OF SECTION



JEO CONSULTING GROUP INC
JEO ARCHITECTURE INC

**PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR
VALLEY CITY PARK – PHASE 1 RENOVATIONS
FOR
VALLEY, NE**

Engineering
Architecture
Surveying
Planning
Funding

**PLANS, SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR
VALLEY CITY PARK – PHASE 1 RENOVATION
FOR
VALLEY, NE**

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JEO PROJECT NO. 221849.01

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**VALLEY CITY PARK – PHASE 1 RENOVATIONS
FOR
VALLEY, NE
JEO PROJECT NO. 221849.01**

The following Specification Sections have been prepared by myself or under my direct supervision:

Sections	Title
Division 00 – All Sections Included	Bidding and Contracting Requirements
Division 01 – All Sections Included	General Requirements
Division 03 – All Sections Included	Concrete
Division 04 – All Sections Included	Masonry
Division 05 – All Sections Included	Metals
Division 06 – All Sections Included	Wood, Plastics, Composites
Division 07 – All Sections Included	Thermal and Moisture Protection
Division 12 – All Sections Included	Furnishings
Division 31 – All Sections Included	Earthwork
Division 32 – All Sections Included	Exterior Improvements

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**VALLEY CITY PARK – PHASE 1 RENOVATIONS
FOR
VALLEY, NE
JEO PROJECT NO. 221849.01**

The following Specification Sections have been prepared by myself or under my direct supervision:

Sections	Title
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07 25 00 – Weather Barriers

07 62 00 – Sheet Metal Flashing and Trim

DIVISION 08 – OPENINGS (NOT USED)

DIVISION 09 – FINISHES (NOT USED)

DIVISION 10 – SPECIALTIES (NOT USED)

DIVISION 11 -- EQUIPMENT (NOT USED)

DIVISION 12 – FURNISHINGS

12 93 00 – Site Accessories

DIVISION 13 – SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 -- CONVEYING EQUIPMENT (NOT USED)

DIVISION 22 – PLUMBING (NOT USED)

DIVISION 23 – HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC) (NOT USED)

DIVISION 26 -- ELECTRICAL

26 00 00 - Electrical Work

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY (NOT USED)

DIVISION 31 -- EARTHWORK

31 10 00 – Site Clearing

31 19 13 – Bioretention Soil

31 22 00 – Grading, Excavation and Embankment

31 23 13 – Subgrade preparation

31 23 23 – Fill and Backfill

31 23 33 – Trenching for Site Utilities

31 25 00 – Erosion Control

DIVISION 32 – EXTERIOR IMPROVEMENTS

- 32 13 13 – Portland Cement Concrete Paving
- 32 13 13.20 – Post-Tensioned Concrete for Courts
- 32 14 13 – Precast Concrete Unit Paving
- 32 15 00 – Aggregate Surfacing
- 32 17 23 – Pavement Marking
- 32 17 26 – Tactile Warning Surfacing
- 32 18 23.53 – Acrylic Color Surfacing for Post-Tensioned Courts
- 32 31 13 – Chain Link Fences and Gates
- 32 31 13.30 – Pickleball Court Equipment
- 32 32 73 – Joint Sealers
- 32 84 00 – Underground Sprinkler System
- 32 92 00 – Turf and Grasses
- 32 93 00 – Plant Materials

DIVISION 33 -- UTILITIES (NOT USED)

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**SECTION 00 01 15
LIST OF DRAWING SHEETS**

GENERAL

G001 COVER SHEET & INDEX OF DRAWINGS

CIVIL

C101 EXISTING CONDITIONS AND DEMOLITION PLAN
C201 SITE LAYOUT PLAN
C202 SITE LAYOUT PLAN: AREA 'A' & ALTERNATE 1
C203 SITE LAYOUT PLAN: AREA 'B'
C204 SITE LAYOUT PLAN : AREA 'C'
C301 SITE GRADING PLAN
C302 SITE GRADING PLAN: AREA 'A'
C303 SITE GRADING PLAN: AREA 'B'
C304 SITE GRADING PLAN : AREA 'C'
C401 SITE EROSION CONTROL PLAN
C402 EROSION CONTROL DETAILS
C501 SITE UTILITY PLAN
C601 SITE DETAILS
C602 SITE DETAILS
C603 SITE DETAILS

LANDSCAPE ARCHITECTURAL

L101 SITE PLANTING PLAN
L102 SITE PLANTING PLAN: AREA 'A'
L103 SITE PLANTING PLAN: AREA 'B'
L104 SITE PLANTING PLAN: AREA 'C'
L201 SITE IRRIGATION PLAN

ELECTRICAL

E000 ELECTRICAL SHEET OVERVIEW
E101 PARK LIGHTING PLAN
E102 PARK POWER PLAN
E201 ENLARGED ELECTRICAL PLANS
E301 ELECTRICAL DETAILS

END OF SECTION

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**SECTION 00 11 13
ADVERTISEMENT FOR BIDS**

FROM:

1.01 THE OWNER (HEREINAFTER REFERRED TO AS OWNER):

City of Valley, NE
203 N Spruce Street
Valley, Nebraska 68064
p) 402.359.2251

1.02 AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):

A. JEO Consulting Group, Inc
2000 Q Street, Suite 500
Lincoln, Nebraska 68503
p) 402.435.3080

1.03 TO: POTENTIAL BIDDERS

- A. Your firm is invited to submit an offer to the Owner for construction of a City park renovation to be located W Vass Street, Valley, NE before 2:00 pm local standard time on 13th day of June 2024 for the following project:
- B. Project Description: The park renovation project shall consist of a new park shelter(s), pickleball courts, basketball court, sand volleyball, new sidewalks, parking, and site lighting. All required site and electrical work shall be included under this contract.
- C. A Pre-Bid Meeting will be held on 23rd day of May 2024 at 10:00am at the project job site, located at W Vass Street, Valley, NE. All General Contractors planning to submit a bid are invited to attend. Pre-bid is not mandatory.
- D. Bids will be received by the City Clerk, 203 N Spruce Street, Valley, NE 68064. Bids will be opened publicly in council chambers at 2pm.
- E. Bid Documents for a Stipulated Sum contract may be obtained by download in PDF format from JEO's website at jeo.com for a nonrefundable fee of \$30.00. Paper copies of the Bid Documents are available at the office of JEO Consulting Group free of charge upon receipt of a refundable deposit, by cash or check, in the amount of \$150.00 for one set if returned within 21 days of Notice of Award in reusable condition. All other requested sets will be at the expense of the contractor to cover actual printing costs.
- F. For plans and specifications that are to be shipped
 - 1. Include a non-refundable \$15.00 shipping and handling fee for each set of plans and specifications.
 - 2. Submit the fee as a separate check.
- G. Bidders will be required to provide Bid security in the form of a Bid Bond of a sum no less than 5 percent of the Bid Amount.
 - 1. Bid security shall be made payable to City of Valley and will be held by the Owner. In case the bid is accepted and the Bidder neglects or refuses to enter into contract and furnish bond in accordance there with, the bid security will be forfeited.
- H. Refer to other bidding requirements described in Document 00 21 13 - Instructions to Bidders and Document 00 31 00 - Available Project Information.
- I. Your offer will be required to be submitted under a condition of irrevocability for a period of 45 days after submission.
- J. The Owner reserves the right to accept or reject any or all offers.

END OF SECTION

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**SECTION 00 21 13
INSTRUCTIONS TO BIDDERS**

INVITATION

1.01 BID SUBMISSION

- A. Bids signed, executed, and dated will be received at the City of Valley, located at 203 N Spruce Street, Valley, NE 68064 before 2:00 pm local standard time on 13th day of June 2024.
- B. Offers submitted after the above time shall be returned to the bidder unopened.
- C. Offers will be opened publicly immediately after the time for receipt of bids.
- D. Amendments to the submitted offer will be permitted if received in writing prior to bid closing and if endorsed by the same party or parties who signed and sealed the offer.

1.02 CONTRACT TIME

- A. The work under this Contract shall commence within seven (7) days of fully executed Contract between the Owner and Contractor and shall be completed by the date as entered on the bid form.
- B. The bidder, in submitting an offer, accepts the Contract Time period stated for performing the Work. The completion date in the Agreement shall be the Contract Time added to the commencement date. The bidder may suggest a revision to the Contract Time with a specific adjustment to the Bid Amount.

BID DOCUMENTS AND CONTRACT DOCUMENTS

2.01 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Information Available to Bidders, Bid Form Supplements To Bid Forms and Appendices identified.
- B. Contract Documents: Defined in AIA A201 Article 1 including issued Addenda.
- C. Bid, Offer, or Bidding: Act of submitting an offer under seal.
- D. Bid Amount: Monetary sum identified by the Bidder in the Bid Form.

2.02 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified as Project Number 221871, as prepared by JEO Architecture, Inc., and with contents as identified in the Table of Contents.

2.03 AVAILABILITY

- A. Bid Documents may be obtained by download in PDF format from JEO's website at jeo.com for a non-refundable fee or at the office of Architect, which is located at 2000 Q Street, Suite 500, Lincoln, NE 68503 p) 402.435.3080.
- B. Refer to Section 00 11 13 ADVERTISEMENT FOR BIDS for deposits required.

2.04 EXAMINATION

- A. Bid Documents may be viewed at the office of Architect.
- B. Bid Documents may be viewed at the office of Owner.
- C. Bid Documents are available for viewing purposes at the following locations:
 - 1. Office of JEO Consulting Group Inc.
 - 2000 Q Street, Suite 500.
 - Lincoln NE 68503.
 - p) 402.435.3080
 - f) 402.435.4110
 - 2. Lincoln Builders Bureau

5910 S 58th St Ste C
Lincoln NE 68516-6410
p) 402.421.8332
f) 402.421.8334

3. Dodge Data & Analytics
dodge.bidding@construction.com
www.construction.com
p) 800.393.6343
f) 800.768.5594
4. Omaha Builders Exchange
4159 South 94th Street
Omaha NE 68127-1223
p) 402.991.6906
f) 402.884.7055
5. Columbus Area Chamber of Commerce
764 33rd Ave
Columbus NE 68601-6428
p) 402.564.2769
f) 402.564.2026
6. Norfolk Builders Exchange
c/o Norfolk Area Chamber of Commerce
609 W Norfolk Ave
Norfolk NE 68701-5140
p) 402.371.4862
f) 402.371.0182

- D. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- E. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

2.05 INQUIRIES/ADDENDA

- A. Direct questions to Eric Casper with JEO Consulting Group, telephone; 402.326.8866, email: ecasper@jeo.com.
- B. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients.

2.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

- A. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 10 days before receipt of bids.
- B. When a request to substitute a product is made, Architect may approve the substitution and will issue an Addendum to known bidders.
- C. The submission shall provide sufficient information to determine acceptability of such products.
- D. Provide complete information on required revisions to other work to accommodate each proposed substitution.
- E. Provide products as specified unless substitutions are submitted in this manner and accepted.

2.07 SITE EXAMINATION

- A. Examine the project site before submitting a bid.

2.08 PREBID CONFERENCE

- A. A bidders conference has been scheduled for 10:00 am on 23rd day of May 2024 at the following location: Valley Park, W Vass Street, Valley, NE
- B. Representatives of JEO Architecture, Inc., will be in attendance.
- C. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

2.09 PROJECT REQUIREMENTS

- A. The contractor agrees that he or she will not induce, by any means, any person employed in the construction, completion, or repair of public work to give up any part of the compensation to which he or she is otherwise entitled.
- B. Federal Water Pollution Control Act
 - 1. The contractor is required to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401–7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251–1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).
- C. Comply with Contract Work Hours and Safety Standard Act (40 U.S.C 3702 and 3704), as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.
- D. Accessibility
 - 1. The Project must comply with the requirements of the Americans with Disabilities Act of 1990 42 U.S.C. §§12101 et seq. (“ADA”) and Architectural Barriers Act of 1968 42 U.S.C. §§4151 et seq. (“ABA”) and regulations promulgated thereunder. The guidelines can be accessed on the following webpage: <https://access-board.gov/ada/>

QUALIFICATIONS

3.01 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.
- B. Refer to General Conditions.

BID SUBMISSION

4.01 SUBMISSION PROCEDURE

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside. Include with bid Form fully executed USDA forms identified to be submitted with bid.

- C. Improperly completed information, irregularities in security deposit, may be cause not to open the Bid Form envelope and declare the bid invalid or informal.
- D. An abstract summary of submitted bids will be made available to all bidders following bid opening.

4.02 BID INELIGIBILITY

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Owner, be waived.

BID ENCLOSURES/REQUIREMENTS

5.01 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond of a sum no less than 5 percent of the Bid Amount on AIA A310 Bid Bond Form.
- B. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.
- C. The security deposit will be returned after delivery to the Owner of the required Performance and Payment Bond(s) by the accepted bidder.
- D. Include the cost of bid security in the Bid Amount.
- E. After a bid has been accepted, all securities will be returned to the respective bidders.
- F. If no contract is awarded, all security deposits will be returned.

5.02 PERFORMANCE ASSURANCE

- A. Accepted Bidder: Provide a Performance and Payment bond as described in 00 73 00 - Supplementary Conditions.
- B. Include the cost of performance assurance bonds in the Bid Amount.

5.03 INSURANCE

- A. Provide an executed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents.
- B. The contractor will be required to obtain Builders Risk Insurance. Include the cost of the insurance in the Bid Amount.

5.04 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.

5.05 SALES AND USE TAXES

- A. The City of Valley is a tax-exempt entity.

5.06 BUILDING PERMITS

- A. The contractor will be required to obtain all necessary building permits from the Authorities Having Jurisdiction. Include all permitting fees within the Bid Amount.

5.07 FEES FOR CHANGES IN THE WORK

- A. Include the fees for overhead and profit on own Work and Work by subcontractors, identified in Document 00 73 00 - Supplementary Conditions.

5.08 BID FORM SIGNATURE

- A. The Bid Form shall be signed by the bidder, as follows:
 - 1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
 - 2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
 - 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
 - 4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

OFFER ACCEPTANCE/REJECTION

6.01 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the bid closing date.

6.02 ACCEPTANCE OF OFFER

- A. Owner reserves the right to accept or reject any or all offers.
- B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Bid Acceptance.

END OF SECTION

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**SECTION 00 41 00
BID FORM**

THE PROJECT AND THE PARTIES

1.01 TO:

City of Valley
203 N Spruce Street
Valley, NE 68064

1.02 FOR:

Valley City Park – Phase 1 Renovations

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

- A. Bidder's Full Name _____
1. Address _____
2. City, State, Zip _____

1.05 OFFER

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by JEO Consulting Group, Inc., Project No. 221849.01 for the above-mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

- B. Base Bid Price: _____
_____ dollars

(\$ _____), in lawful money of the United States of America.

1. We have included the required security Bid Bond as required by the Instruction to Bidders.
2. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.

- C. Alternates: See section 01 23 00 Alternates.

1. **Alternate 1** – North Parking Lot
(deduct) _____ dollars

2. **Alternate 2** – Pickleball Court Lighting
(add) _____ dollars

3. **Alternate 3** – Shelter Lighting and Power
(add) _____ dollars

D. Unit Prices: See Section 01 22 00

1. **Unit Price No. 1** – Unsuitable Material Below Exposed Subgrade.

_____, \$ _____/CY)

2. **Unit Price No. 2** – Place and finish additional 5” concrete pavement and subgrade preparation.

_____, \$ _____/SF)

1.06 ACCEPTANCE

- A. This offer shall be open to acceptance and is irrevocable for forty-five days from the bid closing date.
- B. If this bid is accepted by Owner within the time period stated above, we will:
 - 1. Execute the Agreement within seven days of receipt of Notice of Award.
 - 2. Furnish the required bonds within seven days of receipt of Notice of Award.
 - 3. Commence work within seven days after written acceptance of this bid of this bid.
- C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
- D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

- A. If this Bid is accepted, we will complete the work by: _____(Bidder to enter date)

1.08 CHANGES TO THE WORK

- A. When Architect establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee will be:
 - 1. 10 percent overhead and profit on the net cost of our own Work;
 - 2. 10 percent on the cost of work done by any Subcontractor.
- B. On work deleted from the Contract, our credit to Owner shall be Architect-approved net cost plus 50 percent of the overhead and profit percentage noted above.

1.09 ADDENDA

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum.
 - 1. Addendum # _____ Dated _____.
 - 2. Addendum # _____ Dated _____.
 - 3. Addendum # _____ Dated _____.

1.10 BID FORM SUPPLEMENTS

- A. The following Supplements are attached to this Bid Form and are considered an integral part of this Bid Form:

1. Document 00 43 22 - Unit Prices Form: Include a listing of unit prices specifically requested by Contract Documents.
2. Document 00 43 23 - Alternates Form: Include the cost variations to the Bid Price applicable to the Work as described in Section 01 2300 - Alternates.

1.11 BID FORM SIGNATURE(S)

- A. The Corporate Seal of
- B. _____
- C. (Bidder - print the full name of your firm)
- D. was hereunto affixed in the presence of:
- E. _____
- F. (Authorized signing officer, Title)
- G. (Seal)
- H. _____
- I. (Authorized signing officer, Title)

END OF SECTION

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**SECTION 00 52 00
AGREEMENT FORM**

PART 1 GENERAL

1.01 FORM OF AGREEMENT

1.02 AIA DOCUMENT A101, OWNER-CONTRACTOR AGREEMENT FORM - STIPULATED SUM 2017 EDITION, FORMS THE BASIS OF CONTRACT BETWEEN THE OWNER AND CONTRACTOR.

1.03 RELATED REQUIREMENTS

- A. Section 00 72 00 - General Conditions.
- B. Section 00 73 00 - Supplementary Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF AGREEMENT

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**SECTION 00 72 00
GENERAL CONDITIONS**

FORM OF GENERAL CONDITIONS

1.01 RELATED REQUIREMENTS

1.02 SECTION 00 73 00 - SUPPLEMENTARY CONDITIONS.

**1.03 AIA DOCUMENT A201, GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION,
2017 EDITION, IS THE GENERAL CONDITIONS BETWEEN THE OWNER AND CONTRACTOR.**

END OF DOCUMENT

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**SECTION 00 73 00
SUPPLEMENTARY CONDITIONS**

PART 1 GENERAL

1.01 SUMMARY

1.02 THESE SUPPLEMENTARY CONDITIONS AMEND AND SUPPLEMENT THE GENERAL CONDITIONS DEFINED IN AIA DOCUMENTS A201 - 2017 AND OTHER PROVISIONS OF THE CONTRACT DOCUMENTS AS INDICATED BELOW. ALL PROVISIONS THAT ARE NOT SO AMENDED OR SUPPLEMENTED REMAIN IN FULL FORCE AND EFFECT.

1.03 THE TERMS USED IN THESE SUPPLEMENTARY CONDITIONS THAT ARE DEFINED IN THE GENERAL CONDITIONS HAVE THE MEANINGS ASSIGNED TO THEM IN THE GENERAL CONDITIONS.

1.04 MODIFICATIONS TO GENERAL CONDITIONS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

PART 4 MODIFICATIONS TO AIA A201 - 2017

4.01 ARTICLE 1 - GENERAL PROVISIONS

A. Add the following paragraphs:

1. 1.1.10 Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: nonferrous metals, plastic and polymer-based products, glass, lumber, or drywall.
2. 1.1.11 Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.
3. 1.2.4 In case of disagreement between the drawings and specifications, or within the document itself, contact the Architect to resolve any disagreement.
4. 1.2.5 Contractor is solely responsible for coordination of bidding and scope or Work of subcontractors. Neither Architect or Owner will act as arbiter as to which trade or subcontractor is to furnish and install various items indicated or required to perform construction.
5. 1.9 Notwithstanding anything herein to the contrary, the Owner and Contractor agree to execute such other documents as may be necessary for Owner to be in compliance with all rules and regulations of the Federal Emergency Management Act or Nebraska Emergency Management Act.

4.02 ARTICLE 2 OWNER

A. Delete the following paragraph in its entirety:

1. 2.1.2.
2. Delete Subparagraph 2.3.6 in its entirety and replace with the following:
3. The Contractor will be furnished free of charge a minimum 2 copies of drawings and project manuals.. Additional sets will be furnished at the cost of reproduction, postage and handling. Signed and sealed prints as required for governing authority's review and approval will be supplied at no cost.

4.03 ARTICLE 3 - CONTRACTOR

A. Add the following subparagraphs:

1. 3.4.4 Acceptance of materials by or on behalf of Architect does not bar future rejection if subsequently found to be defective or inferior in quality or uniformity to material specified or not as represented.
2. 3.4.5 After the Contract has been executed, the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions listed below:
 - a. By making requests for substitutions, the Contractor:
 - 1) Represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified.
 - 2) Represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified.
 - 3) Certifies that the cost data presented is complete and includes all related costs under this Contract, except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently becomes apparent.
 - 4) Will coordinate the installation of the accepted substitute, making such changes as may be required for work in all respects.
 - 5) Will reimburse Owner and Architect for review on redesign services associated with reapproval by Architect.
3. 3.5.3 The Prime Contractor does hereby guarantee the Work to conform to the Warranty described (in 3.5.1) for a period of one full year from the date of acceptance of the Work as designated in the Certificate of Substantial Completion.

4.04 ARTICLE 4 - ADMINISTRATION OF THE CONTRACT

- A. Add the following paragraph:
 1. 4.1.3 In carrying out any provisions of Contract or in exercising any power or authority granted thereby, there is no liability upon Architect to the Contractor, either personally or as an official of Owner, it being understood that in such matters the Architect acts as agent and representative of Owner.

4.05 ARTICLE 5 - SUBCONTRACTORS

- A. Add the following subparagraph:
 1. 5.1.3 Architect shall not work directly with any subcontractor, sub-subcontractor or materials supplier. Contact to the Architect shall be made only through Contractor. Requests for information or clarification must be routed through Contractor.
- B. Add the following subparagraph:
 1. 5.3.1 Contractor is fully responsible for acts and omissions of all subcontractors, and persons either directly or indirectly employed by them.

4.06 ARTICLE 7 - CHANGES IN THE WORK

- A. Add the following subparagraphs:
 1. 7.1.4 The Contractor shall not proceed with or commence any work for which contractor will request additional compensation or which is deemed to be a Change in the Work without first receiving a signed written Change Order properly executed, or a written order or authorization to proceed from the Architect.
 2. 7.1.5 Failure of the Contractor to obtain written approval or authorization for any Changes in the Work shall constitute cause for rejection of a request for approval of any additional compensation associated with the Work.
 3. 7.3.11 For all additional work covered by approved Change Orders or Construction Change Directives, the Contractor shall submit a price quotation which includes a complete breakdown of the cost of the Work, including labor, materials, equipment, subcontract work, and overhead and profit. The following fees apply to Changes in the Work in accordance with Subparagraph 7.3.4:

- a. 10 percent overhead and profit on the net cost of Work done by the Contractor;
- b. 10 percent overhead and profit on the cost of Work done by any Subcontractor;
- c. On Work deleted from the Contract, credit to the Owner shall be the Architect approved net cost plus 1/2 of the overhead and profit percentage noted above.

4.07 ARTICLE 8 - TIME

- A. Add the following subparagraph:
 - 1. 8.1.2.1 Do not start work or store materials or equipment on site until written notice to proceed is issued, or upon execution of Contract.
- B. Add the following subparagraph:
 - 1. 8.3.4 Owner may waive above requirements and grant extensions of time for any reason.

4.08 ARTICLE 9 - PAYMENTS AND COMPLETION

- A. Add the following subparagraphs:
 - 1. 9.3.1.01 Until the work is 100 percent complete, the Owner shall pay 90 percent of the amount certified by the Architect on account of progress payments. Pursuant to Nebraska State Statute, retainage shall be reduced to 5% when work reaches 50% completion. (This nets a total of 7.5% retainage by the end of the project)
 - 2. 9.3.3.1 Lien Releases and Receipted Bills, add the following: Before receiving any payment, except the first, the Contractor shall furnish to the Architect, along with his "Request for Payment," partial (or final as the case may be) lien releases covering all materials used and subcontracts performed in connection with his contract through the date of the previous billing. In addition, the Contractor shall furnish with each request for payment, including the first, the contractor's own waiver of lien in the full amount of the request shall include a list of subcontractors, sub-subcontractors, and suppliers whose lien releases will be furnished with the following months request. Should the Contractor fail to furnish required lien releases, the amount of his "Request for Payment" not covered by such lien releases may not be certified.
 - 3. 9.3.3.2 Final Waivers of Lien, add the following: Before final payment will be made, the Contractor shall furnish final waivers of lien, or receipted bills, covering all materials used and subcontracts performed in connection with his contract, including his own final waiver of lien in the full amount of the contract.
- B. Add the following to the sentence to subparagraph 9.8.1
 - 1. Subject only to completion of minor punch-list items, the absence of completion of which does not interfere with the Owner's intended use of the Project.
- C. Add the following sentence to subparagraph 9.10.3;
 - 1. Notwithstanding the foregoing, in no event shall the retainage attributable to the unfinished Work be less than 125% of Owner's good faith estimate of the cost of finally completing the Work.

4.09 ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

- A. Add the following paragraphs:
 - 1. Add the following sentence to subparagraph 10.1:
 - a. This requirement applies continuously and is not limited to normal working hours.
 - 2. 10.1.1 The Contractor shall be required, in compliance with the Asbestos Emergency Response Act of 1986, to certify that all products and materials supplied as a part of this project shall be free of Asbestos.
- B. Add the following subparagraph 10.2.2.1:
 - 1. Contractor shall give notice in writing at least 48 hours before breaking ground to all persons, public utility companies, Owners of property having structures or improvements in proximity to site of the Work, and superintendents, inspectors, or those otherwise in charge of property, streets, water pipes, gas pipes, sewer pipes, telephone cables, electric cables, railroads or otherwise, who may be affected by Contractor's operation, in order

that they may remove any obstruction for which they are responsible and have representative on site to see that their property is properly protected. Such notice does not relieve Contractor of responsibility for any damages, claims, and defense of all actions against Owner and Architect resulting from performance of such work in connection with or arising out of Contract.

- C. Add new subparagraphs:
 - 1. 10.2.9 Duty of Architect to conduct construction review of Contractor's performance does not include review of adequacy of Contractor's safety measures in, on, or near construction site.
 - 2. 10.2.10 Maintain utilities or other service, indicated to be abandoned, in service until new facilities are provided, tested and ready for use.
 - 3. 10.2.11 Return all improvements on or about site and adjacent property which are not shown to be altered, removed or otherwise changed to conditions which existed previous to starting work.
- D. Add new paragraphs:
 - 1. 10.3.7 Water Precautions: Keep all parts of site, including excavations, free from any accumulation of water, no matter what source of cause.
 - 2. 10.3.7.1 Dispose of water in such manner as will not endanger public health or cause damage or expense to property. Comply with requirements of any public agencies having jurisdiction. If sewers and streets are allowed to be used for drainage or disposal of water furring construction, maintain and leave these satisfactorily clean upon completion of work.
- E. Add new paragraphs:
 - 1. 10.3.8 Signs: Do not erect signs, billboards, or advertisements on or about premises, without prior approval, except as required by Contract.
 - 2. 10.3.8.1 Furnish and maintain all necessary signs required for prosecution of the Work and as required by law.

4.10 ARTICLE 13 - MISCELLANEOUS PROVISIONS

- A. Add the following to paragraph 13.4.1:
 - 1. Contractor shall provide the testing and inspection services required by the Contract Documents at the Contractors expense.
- B. Delete paragraph 13.5 in its entirety.

4.11 ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

- A. Add the following to subparagraph:
 - 1. 14.2.3 In all cases of termination or Contractor default, Architect will bill Owner for cost of additional services required in connection with reissuing documents or completing the Work. Owner will deduct this sum from money due Contractor and pay it to Architect.

END OF SECTION



AIA® Document G715™ – 2017

Supplemental Attachment for ACORD Certificate of Insurance 25

PROJECT: <i>(name and address)</i> Blank	CONTRACT INFORMATION: Contract For: General Construction Date:	CERTIFICATE INFORMATION: Producer: Insured: Date:
OWNER: <i>(name and address)</i>	ARCHITECT: <i>(name and address)</i> JEO Architecture, Inc. 2700 Fletcher Avenue Lincoln, Nebraska 68504	CONTRACTOR: <i>(name and address)</i>

A. General Liability		Yes	No	N/A
1.	Does this policy include coverage for:			
a	Damages because of bodily injury, sickness, or disease, including occupational sickness or disease, and death of any person?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Personal injury and advertising injury?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Damages because of physical damage to or destruction of tangible property, including the loss of use of such property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Bodily injury or property damage arising out of completed operations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	The Contractor's indemnity obligations included in the Contract Documents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Does this policy contain an exclusion or restriction of coverage for:			
a	Claims by one insured against another insured, where the exclusion or restrictions is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Claims for bodily injury other than to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Claims for the Contractor's indemnity obligations included in the Contract Documents arising out of injury to employees of the insured?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	Claims for loss excluded under a prior work endorsement or other similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f	Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g	Claims related to residential, multi-family, or other habitational projects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h	Claims related to roofing?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i	Claims related to exterior insulation finish systems, synthetic stucco, or similar exterior coatings or surfaces?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j	Claims related to earth subsistence or movement?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k	Claims related to explosion, collapse, and underground hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Other Insurance Coverage		Yes	No	N/A
1.	Indicate whether the Contractor has the following insurance coverages and, if so, indicate the coverage limits for each.			
a	Professional liability insurance Coverage limits:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Pollution liability insurance Coverage limits:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Insurance for maritime liability risks associated with the operation of a vessel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Coverage limits:
- d** Insurance for the use or operation of manned or unmanned aircraft
- Coverage limits:
- e** Property insurance
- Coverage limits:
- f** Railroad protective liability insurance
- Coverage limits:
- g** Asbestos abatement liability insurance
- Coverage limits:
- h** Insurance for physical damage to property while it is in storage and in transit to the construction site
- Coverage limits:
- i** Other:

(Authorized Representative)

(Date of Issue)



AIA[®] Document A101[™] – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the day of in the year
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

TABLE OF ARTICLES

A.1 GENERAL

A.2 OWNER'S INSURANCE

A.3 CONTRACTOR'S INSURANCE AND BONDS

A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201[™]-2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

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

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. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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 Document A201[™]-2017, General Conditions of the Contract for Construction. Article 11 of A201[™]-2017 contains additional insurance provisions.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit
Special Form or All Risk	Policy Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit
Transit / Off Site Storage	\$250,000.00

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to

Init.

the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- § A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

- § A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

- § A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

- § A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

- § A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

- § A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

- § A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

- § A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

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[] § A.2.5.2 Other Insurance

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

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than One million Dollars and Zero Cents (\$ 1000000.00) each occurrence, Five million Dollars and Zero Cents (\$ 5000000.00) general aggregate, and Five million Dollars and Zero Cents (\$ 5000000.00) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- .11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than One million Dollars and Zero Cents (\$ 1000000.00) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than Five hundred thousand Dollars and Zero Cents (\$ 500000.00) each accident, Five hundred thousand Dollars and Zero Cents (\$ 500000.00) each employee, and Five hundred thousand Dollars and Zero Cents (\$ 500000.00) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than One million Dollars and Zero Cents (\$ 1000000.00) per claim and One million Dollars and Zero Cents (\$ 1000000.00) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than One million Dollars and Zero Cents (\$ 1000000.00) per claim and One million Dollars and Zero Cents (\$ 1000000.00) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than One million Dollars and Zero Cents (\$ 1000000.00) per claim and Two million Dollars and Zero Cents (\$ 2000000.00) in the aggregate.

(Paragraphs Deleted)

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

§ A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below: *(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)*

§ A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for Work within fifty (50) feet of railroad property.

§ A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than (\$) per claim and (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

§ A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

§ A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

§ A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits
Umbrella Excess Liability	\$5,000,000.00

Init.

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	100% of Contract Amount
Performance Bond	100% o Contract Amount

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

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**SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 00 52 00 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.
- B. Section 00 73 00 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.
- C. Section 01 21 00 - Allowances: Payment procedures relating to allowances.

1.03 SCHEDULE OF VALUES

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- B. Forms filled out by hand will not be accepted.
- C. Submit a printed schedule on AIAI Form G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form will be considered.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.
- F. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- G. Include separately from each line item, a direct proportional amount of Contractor's overhead and profit.
- H. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.

- 9. Balance to Finish.
- 10. Retainage.
- E. Form: AIA G702 Application and Certificate for Payment and AIA G703 - Continuation Sheet including continuation sheets when required.
- F. Execute certification by signature of authorized officer.
- G. Submit one electronic and three hard-copies of each Application for Payment.
- H. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
- B. Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract by issuing supplemental instructions on AIA form G710
- C. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 - 2. Promptly execute the change.
- D. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
- F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- I. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
 - 1. All closeout procedures specified in Section 01 70 00.
 - 2. Completion of all work except those items agreed upon by Owner.
 - 3. Removal of temporary facilities and enclosures.

END OF SECTION

**SECTION 01 22 00
UNIT PRICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.3 DEFINITIONS

- A. Unit price is a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections. In event of conflict, requirements of individual Specification Sections shall govern.
 - 1. Take measurements and compute quantities. Measurements and quantities shall be verified by Architect/Engineer. Assist by providing necessary equipment and workers as required.
 - 2. Measurement shall be by linear dimension, at item centerline or mean chord.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price. Unit shall cover both additions and subtractions to the

1.5 PAYMENT

- A. Payment for Work governed by unit prices will be made on basis of actual measurements and quantities of Work which is incorporated in or made necessary by the Work and accepted by Architect/Engineer, multiplied by unit price.
- B. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products remaining on hand after completion of the Work.
 - 4. Loading, hauling, and disposing of rejected Products.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price No. 1: Provide a unit price for unsuitable material below Exposed Subgrade: Unit price for volume of unsuitable soil materials removed below Exposed Subgrade as directed by the Geotechnical Engineer. This unit price shall include the replacement of an equal volume of satisfactory soil material. Unit of Measurement: Cubic Yard.
- B. Unit Price No. 2: Provide a unit price to provide, place and finish additional 5" reinforced concrete pavement and subgrade preparation. Unit of Measurement: Square Foot.

END OF SECTION

**SECTION 01 23 00
ALTERNATES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: North Parking Lot

1. Base Bid: The total base bid price shall include a concrete parking lot, concrete curb and gutter, and parking stall striping.
2. Alternate: The total price to deduct the concrete parking lot to a gravel parking lot with concrete curb and gutter and concrete paving and striping only for the ADA stalls as indicated on the drawings.

B. Alternate No. 2: Pickleball Court Lighting

1. Base Bid: The total base bid price shall not include any work related the installation of the pickle ball courts lighting.
2. Alternate: The total price to add lighting as indicated on the drawings.

C. Alternate No. 3: Shelter Power and Lighting

1. Base Bid: The total base bid price shall include the work related the installation of power and lighting for one park shelter power and light as indicated on the plans.
2. Alternate: The total price to add power and lighting for the final two park shelters as indicated on the drawings.

END OF SECTION

**SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Coordination drawings.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Requests for Information (RFI) procedures.
- H. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 00 72 00 - General Conditions: Dates for applications for payment.
- B. Section 01 32 16 - Construction Progress Schedule: Form, content, and administration of schedules.
- C. Section 01 60 00 - Product Requirements: General product requirements.
- D. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- E. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punch list, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

8. Contractor is responsible for subscribing and payment for electronic submittal service.
- B. Submittal Service: The selected service is:
 1. Submittal Exchange (tel: 1-800-714-0024): www.submittalexchange.com/#sle.
- C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Contractor will schedule a meeting after Notice of Award.
- B. Attendance Required:
 1. Owner.
 2. Architect.
 3. Contractor.
 4. Subcontractors.
- C. Agenda:
 1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract, Contractor, Owner and JEO Consulting Group.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.
 7. Review of off-site fabrication and delivery schedules.
 8. Maintenance of progress schedule.
 9. Corrective measures to regain projected schedules.

10. Planned progress during succeeding work period.
 11. Coordination of projected progress.
 12. Maintenance of quality and work standards.
 13. Effect of proposed changes on progress schedule and coordination.
 14. Other business relating to work.
- E. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE - SEE SECTION 01 32 16

3.05 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.06 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in the Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of the Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare in a format and with content acceptable to Architect.
 3. Prepare using software provided by the Electronic Document Submittal Service.
 4. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from the Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 60 00 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in conformance to requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, the Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.

- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 - 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 - 2. Owner's, Architect's, and Contractor's names.
 - 3. Discrete and consecutive RFI number, and descriptive subject/title.
 - 4. Issue date and requested reply date.
 - 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 - 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 - 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 - 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 - 2. Note dates of when each request is made, and when a response is received.
 - 3. Highlight items requiring priority or expedited response.
 - 4. Highlight items for which a timely response has not been received to date.
 - 5. Identify and include improper or frivolous RFIs.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 - 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 - 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 - 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 - 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 - 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.07 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.

- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

3.08 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.
 - 6. Manufacturer's field reports.
 - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.09 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.10 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Documents for Review:
 - 1. Small Size Sheets, Not Larger Than 8-1/2 by 11 inches: Submit one copy; the Contractor shall make Contractor's own copies from original returned by the Architect after making a file copy.
 - 2. Small Size Sheets, Not Larger Than 8-1/2 by 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
 - 3. Larger Sheets, Not Larger Than 36 by 48 inches: Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.
- D. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.

3.11 SUBMITTAL PROCEDURES

- A. General Requirements:

- B. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- C. Transmit each submittal with a copy of approved submittal form.
- D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Shop drawings will be rejected if not reviewed by the Contractor prior to submittal to the Architect.
- G. Deliver submittals to Architect at business address.
- H. Schedule submittals to expedite the Project, and coordinate submission of related items.
- I. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- J. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- K. Provide space for Contractor and Architect review stamps.
- L. When revised for resubmission, identify all changes made since previous submission.
- M. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

3.12 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:

- a. "Received" - to notify the Contractor that the submittal has been received for record only.
- 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION

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SECTION 01 32 16
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.02 REFERENCE STANDARDS

- A. AGC (CPSM) - Construction Planning and Scheduling Manual 2004.
- B. M-H (CPM) - CPM in Construction Management - Project Management with CPM; O'Brien 2006.

1.03 SUBMITTALS

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 5 days.
- C. Within 14 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major Subcontractors have reviewed and accepted proposed schedule.
- D. Within 7 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- G. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

1.04 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Sheet Size: Multiples of 8-1/2 x 11 inches.
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Identify work of separate stages and other logically grouped activities.
- D. Provide sub-schedules to define critical portions of the entire schedule.
- E. Include conferences and meetings in schedule.
- F. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

- G. Provide separate schedule of submittal dates for shop drawings, product data, and samples, owner-furnished products, products identified under Allowances, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- H. Indicate delivery dates for owner-furnished products.
- I. Coordinate content with schedule of values specified in Section 01 20 00 - Price and Payment Procedures.
- J. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

**SECTION 01 40 00
QUALITY REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. References and standards.
- B. Submittals.
- C. References and standards.
- D. Control of installation.
- E. Tolerances.
- F. Testing and inspection agencies and services.
- G. Control of installation.
- H. Tolerances.
- I. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Document 00 31 00 - Available Project Information: Soil investigation data.
- B. Document 00 72 00 - General Conditions: Inspections and approvals required by public authorities.
- C. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- D. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- E. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Testing Agency Qualifications:
 - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents, or for Owner's information.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.

- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit report in duplicate within 30 days of observation to Architect for information.
 - 2. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the contract documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.04 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor will employ services of Olsson to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.03 TESTING AND INSPECTION

- A. See individual specification sections for testing required.
- B. Testing Agency Duties:
 - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 2. Perform specified sampling and testing of products in accordance with specified standards.
 - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 - 5. Perform additional tests and inspections required by Architect.
 - 6. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.

- b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
- c. To facilitate tests/inspections.
- d. To provide storage and curing of test samples.
- 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
- 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.04 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Security requirements.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

1.02 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- B. Existing facilities may not be used.
- C. New permanent facilities may not be used.

1.03 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 FENCING

- A. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.06 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.08 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.

- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.09 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site weekly.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 01 60 00
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 15 days after date of Agreement.
 - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 25 00 - Substitution Procedures.
- B. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period and the documents required. Comply with requirements specified in Section 00 21 13.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- E. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- G. Substitution Submittal Procedure:
 - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. Architect will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.

- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide off-site storage and protection when site does not permit on-site storage or protection.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- K. Prevent contact with material that may cause corrosion, discoloration, or staining.
- L. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- M. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

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**SECTION 01 70 00
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Surveying for laying out the work.
- D. Cleaning and protection.
- E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- F. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01 50 00 - Temporary Facilities and Controls: Temporary interior partitions.
- E. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.03 QUALIFICATIONS

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,

1.04 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.

- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- C. Execute cutting and patching including excavation and fill to complete the work, to uncover working order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to integrate with other work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

- L. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.06 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Prohibit traffic from landscaped areas.
- H. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.09 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Replace filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.

- B. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- C. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- D. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- E. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- F. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- G. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.11 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

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**SECTION 01 78 00
CLOSEOUT SUBMITTALS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 00 73 00 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

- 1. Drawings.
- 2. Specifications.
- 3. Reviewed shop drawings, product data, and samples.
- 4. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Store record documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and modifications.
- E. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 2. Field changes of dimension and detail.
 3. Details not on original Contract drawings.
- F. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

3.02 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

- I. Additional Requirements: As specified in individual product specification sections.

3.04 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- N. Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

- O. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect , Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.05 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

**SECTION 03 30 00
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete topping on structural stoops.
- C. Floors and slabs on grade.
- D. Concrete foundation walls.
- E. Concrete reinforcement.
- F. Joint devices associated with concrete work.
- G. Miscellaneous concrete elements, including equipment pads.
- H. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: for procedural requirements for testing of concrete.
- B. Section 03 35 11 - Concrete Floor Finishes
- C. Section 07 90 05 - Joint Sealers.
- D. Section 32 13 13 - Concrete Paving: for exterior concrete.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2006.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.
- G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).
- H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.
- J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.
- K. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- L. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- M. ASTM C 33 - Standard Specification for Concrete Aggregates; 2007.
- N. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2005.

- O. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.
- P. ASTM C 143/C 143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2008.
- Q. ASTM C 150 - Standard Specification for Portland Cement; 2007.
- R. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.
- S. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2008a.
- T. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.
- U. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.
- V. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.
- W. ASTM E1155 Standard Test Method for Determining *FF* Floor Flatness and *FL* Floor Levelness Numbers"

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements.
- C. Design Mixes: For each concrete mix, include mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.
 - 1. Indicate amounts of mix water to be withheld for later addition at project site.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates
 - 2. Steel reinforcement and reinforcement accessories
 - 3. Admixtures
- E. Shop Drawings - Steel Reinforcement: Details of fabrication, bending, and placement prepared according to ACI 315.
 - 1. Included material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement and supports of concrete reinforcement.
 - 2. Include special reinforcement required for openings through concrete structures.
- F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.
- D. Installer Qualifications: An experienced installer who has completed concrete work 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.
- E. Manufacturer's Qualifications: Firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association Certification of Ready Mixed Concrete Production Facilities.
- F. Testing Agency Qualifications: Independent testing agency acceptable to authorities having jurisdiction qualified according to ASTM C 1077 and ASTM E 329 to conduct testing indicated as documented according to ASTM E 548.

- G. Obtain each type or class of cementitious material of the same brand from the same source, aggregate from same source, and each admixture from same source.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Avoid damaging coatings on steel reinforcement.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.
 - 1. Exposed finished concrete surfaces shall be formed using plywood, metal or other approved panel material. Provide continuous, straight, smooth, exposed surfaces and furnish forms in largest possible sizes to minimize the number of joints and that conform to joint system shown on plans.
 - a. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form, Class 1"
 - b. Use of aluminum forms is allowed.
 - 2. Unexposed finished concrete surfaces shall be formed using plywood, metal or other approved panel material. Provide lumber dressed on at least two (2) edges and one side for tight fit.
 - a. Use of aluminum forms is prohibited.
 - 3. Form Coatings shall be commercial formulation foam-coating compounds with a minimum VOC of 350 mg/L that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - a. For steel forms, formulate form-release agent with rust inhibitor.
 - 4. Form Ties shall be factory fabricated, adjustable length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling concrete upon removal.
 - a. Provide ties that will leave no metal closer than 1-1/2 inches to exposed surface.
 - b. Provide ties that will leave holes no larger than 1 inch diameter in concrete surface.
 - 5. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 6. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420), deformed.
- B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
 - 1. Fabricated from as-drawn steel wire into flat sheets. Rolled sheets not permitted
- C. Reinforcement Accessories:
 - 1. Chairs, Bolsters, Bar Supports, Spacers and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Sized and shaped for adequate support of reinforcement during concrete placement.
 - 2. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type I or Type III Portland Cement.
 - 1. Acquire all cement for entire project from same source, type, and brand.
 - 2. Cement may be supplemented with Fly Ash: ASTM C 618, Class C.
- B. Normal-weight Aggregates: ASTM C 33, graded, 3/4 inch and 1-1/2 inch nominal maximum coarse-aggregate size.

- C. Fine Aggregates: Free of materials with deleterious reactivity to alkali in cement.
 - 1. Acquire all aggregates for entire project from same source.
- D. Water: Clean and not detrimental to concrete. ASTM C 94 and potable.

2.04 CHEMICAL ADMIXTURES

- A. Provide admixtures certified by manufacturer to be compatible with other admixtures. Do not use calcium chloride or admixtures containing calcium chloride.
- B. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- C. Air Entrainment Admixture: ASTM C 260.
- D. High Range Water Reducing and Retarding Admixture: ASTM C 494/C 494M Type G.
- E. High Range Water Reducing Admixture: ASTM C 494/C 494M Type F.
- F. Water Reducing and Retarding Admixture: ASTM C 494/C 494M Type D.
- G. Retarding Admixture: ASTM C 494/C 494M Type B.
- H. Water Reducing Admixture: ASTM C 494/C 494M Type A.
- I. Plasticizing and Retarding Admixture: ASTM C 1017, Type II
- J. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1 to 1-1/2 inches long.

2.05 ACCESSORY MATERIALS

- A. Vapor Barrier Membrane must meet the following requirements.
 - 1. Maintain permeance of less than 0.01 Perms [grains/(ft² · hr · inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 15 mils minimum
 - c. Water Vapor Permeance: ASTM F1249, 0.0086 perms
 - d. Puncture Resistance: ASTM D1709, 2,266 grams
 - e. Tensile Strength: ASTM D882, 70.6lbf/in.
 - 3. Acceptable Manufacturers:
 - a. Stego Wrap 15-mil Vapor Barrier by STEGO INDUSTRIES, LLC., San Juan Capistrano, CA (877) 464-7834, www.stegoindustries.com.
 - b. Premoulded Membrane with Plasmatic Core by W.R. Meadows, Hampshire, IL (847)214-2100, www.wrmeadows.com.
 - c. Zeroperm by Alumiseal, Hanover, MA (781) 261-9991.
 - d. Viper II 15-mil Vapor Barrier, by Insulation Solution, Inc.
 - 4. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated pipe boots, etc., for sealing seams and penetrations in vapor retarder.
 - a. Water vapor transmission rate of 0.3 Perms or lower as per ASTM E 96.

2.06 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable

- E. Clear, Waterborne, Membrane-forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A, exterior applications

2.07 RELATED MATERIALS

- A. Expansion- and Isolation-Joint Filler Strips: Sonneborn Sonoflex F or equal.
- B. Granular Fill: Nebraska Department of Roads 47B Sand Gravel Mix as identified within the Geotechnical Exploration Report. (See specification Section 00 31 00 - Available Project Information)
- C. Patching compound: Cement-based compound for applications from one inch thick to feathered edge.
- D. Bonding Compound: Polyvinyl acetate or acrylic base.

2.08 CONCRETE MIX DESIGN

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Proportioning Normal Weight Concrete Mixture for interior slabs-on-grade:
 - 1. Minimum compressive strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: Do not allow air content of troweled finished floors to exceed 3 percent.
- C. Proportioning Normal Weight Concrete Mixture for foundation walls as follows:
 - 1. Minimum compressive Strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.
- D. Proportioning Normal Weight Concrete Mixture for footings as follows:
 - 1. Minimum compressive Strength: 3,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.53.
 - 4. Fly ash or other pozzolans not to exceed 25 percent of cement content by weight.
 - 5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
 - 6. Air Content: 6 percent plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.
- E. Proportioning Normal Weight Concrete Mixture for concrete topping on structural stoops as follows:
 - 1. Minimum compressive Strength: 4,000 psi at 28 days.
 - 2. Limestone mix with 3/4 inch coarse-aggregate size.
 - 3. Maximum Water-Cementitious Materials Ratio: 0.48.
 - 4. Fly ash or other pozzolans not to exceed 15 percent of cement content by weight.

5. Slump Limit: 3 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
6. Air Content: 6 percent plus or minus 1.5 percent at point of delivery for 3/4 nominal maximum aggregate size.

2.09 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to the Concrete Reinforcing Steel Institute's (CRSI) "Manual of Standard Practice."

2.10 MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and furnish batch ticket information.
 1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes. When air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
 1. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated within tolerance limits of ACI 117.
 - a. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses and the like for easy removal.
 - b. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
 - c. Chamfer exterior corners and edges of permanently exposed concrete.
 - d. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris before placing concrete.
 - e. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
 - f. Verify that forms are clean and free of rust before applying release agent. Coat contact surfaces of forms with form-releasing agent according to manufacturer's directions before placing reinforcement.
- B. Embedded Items: Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor bolts, accurately located, to elevations required.
- C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

3.03 INSTALLING REINFORCEMENT

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
 1. Do not cut or puncture vapor barriers. repair damage and reseal vapor retarder before placing concrete.

- B. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by bolsters, chairs, or other devices to maintain minimum concrete cover. Do not secure reinforcement to re-bar driven into ground or on rocks, dirt clods, or other debris. Do not "float in" reinforcement.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete not toward exposed concrete surfaces.
- D. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire. Rolled stock is not permitted.
 - 1. Lap edges and ends of adjoining sheets at least one full mesh spacing and lace splices with tie wire.
 - 2. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

3.04 PREPARATION AT TOPPING AREAS

- A. At concrete areas designated to receive cast-in-place concrete toppings, ensure surface is clean and free of debris.
- B. Apply bonding compound at manufacturer's recommended rate immediately before placing concrete (or as recommended by manufacturer).

3.05 JOINT PLACEMENT

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install diamond dowels per structural details so strength and appearance of concrete are not impaired at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness and at a maximum length to width ratio of 1.25 and as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations as indicated.
 - 1. Extend joint filler strips full width and depth of joint terminating flush with finished concrete surface unless otherwise indicated.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants are indicated.
 - 3. Install joint-filler strips in lengths as long as practical. Where more than one length is required, lace or clip sections together.
- E. Dowel Joints: Install diamond dowel sleeves and dowel support assemblies at joints where indicated. Use dowel sleeves or lubricate or asphalt-coat 1/2 of dowel length to prevent concrete bonding to 1 side of joint.
- F. Water Stops: Install flexible water stops in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practical. Support and protect exposed water stops during progress of work. Field Fabricate joints in water stops according to manufacturer's instructions.
- G. Provide joint fillers and sealant at all isolation and expansion joints but not at contraction joints.

- H. At concrete toppings, tool or sawcut control joints immediately over existing joints. If existing concrete is cracked, install joints on lines parallel and perpendicular to the building as close to the crack locations as possible.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Cold-weather Placement: Comply with ACI 306.1
- D. Hot-weather Placement: Comply with ACI 305R.
- E. Before placing concrete, ensure installation of formwork, reinforcement, embedded parts, formed construction joint devices, and vapor barriers is complete and will not be disturbed during concrete placement.
- F. Before placing concrete, verify that all required inspections have been performed.
- G. Repair under slab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.
- H. Install joint devices in accordance with manufacturer's instructions.
- I. Deposit concrete continuously or in layers at such thickness that no concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
 - 1. Concrete free fall distance shall not exceed 5 feet. This includes free fall in a discharge pipe. Chute and tremie pipes may be used for conveying concrete to the forms when authorized by the Architect.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- J. Deposit concrete in forms in horizontal layers no deeper than 18 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.
- K. Deposit and consolidate concrete for floors and slabs in continuous operation within limits of construction joints until placement of panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drain where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-texture surface plane, free of humps or hollows, before excess moisture or bleed water appears on surface. Do not further disturb slab surfaces before starting finishing operations.
- L. Screed floors level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

3.07 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
 3. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
1. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Re-straighten, cut down high spots and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
 - a. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing.
 2. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - a. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic, or quarry tile set over a cleavage membrane, paint, or another thin-film finish coating system.
 - b. Finish and measure surface to conform to *FF* 50, - *FL* 50 tolerances, very flat for areas to received polished concrete finish. Refer to Section 03 35 11, Concrete Floor Finishes.
 3. Trowel and Fine-Broom Finish: Apply a first trowel finish to pavement surfaces. While concrete is still plastic, slightly scarify surface with a fine broom.
 - a. Comply with flatness and levelness tolerances for trowel finished floor surfaces.
 4. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 5. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
 6. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.08 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days.
 2. Moisture Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete placed in widest practicable width with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Cure for not less than 7 days. 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.
 - a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer

unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.
5. a. Product: L&M Cure 'R' as manufactured by L&M Chemicals
- C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finish.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces by one of the methods listed above in formed surfaces.
 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.

3.09 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's directions.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints. Leave contact faces of joint clean and dry.
- C. Install semi-rigid epoxy joint filler depth in saw-cut joints and at least 2 inches into deep-formed joints. Overfill joint and trim joint filler flush with lip of joint after hardening.

3.10 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified on structural sheet S501 and Section 01 40 00.
 1. Testing Services: Tests shall be performed according to ACI 301.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- D. Compressive Strength Tests: ASTM C 39/C 39M. For each day's pour, mold and cure four concrete test cylinders. Obtain test samples for every 50 cu yd thereafter, or less for each class of concrete placed. One specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
 1. Strength of each concrete mix will be satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test, following procedures of ASTM C 143/C 143M, at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
- G. Perform air content tests for each day's pour of each type of air-entrained concrete.
 1. ASTM C 173 - volumetric method for lightweight or normal weight concrete
 2. ASTM C 231 - pressure method for normal weight concrete

- H. Report test results in writing to Owner, Architect, Structural Engineer, Ready-Mix Producer, and Contractor within 24 hours after tests.
- I. 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 be met. Conduct tests by core cylinders complying with ASTM C 42 or other methods as directed by the Architect.
- J. Concrete Trucks shall not be rinsed on Owner's property nor on adjacent property.

3.11 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- C. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades. Mix, place, and cure concrete to blend with in-place construction.
- D. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and slope using a template. Correct low and high areas as herein specified.
 - 1. Repair finished unformed surfaces that contain defects that affect durability of concrete, reinforcement, spalling, popouts, honeycomb, rock pockets, and other objectionable conditions.
 - 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 3. Correct low areas in unformed surfaces by cutting out low areas and replacing with patching compound. Finish repaired areas to blend into adjacent concrete.
 - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type of class as original concrete. Place, compact, and finish to blend with adjacent finished concrete.

END OF SECTION

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**SECTION 04 20 00
UNIT MASONRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete Block.
- B. Clay Facing Brick.
- C. Mortar and Grout.
- D. Reinforcement and Anchorage.
- E. Flashings.
- F. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- B. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

- A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2018, with Editorial Revision (2018).
- D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018.
- E. ASTM C55 - Standard Specification for Concrete Building Brick; 2017.
- F. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2017.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.
- H. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- I. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.
- J. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.
- K. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2018.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- M. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.
- N. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.
- O. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.
- P. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- Q. ASTM C476 - Standard Specification for Grout for Masonry; 2018.
- R. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2018a.
- S. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing; 2017.
- T. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

- U. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- V. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- W. UL (FRD) - Fire Resistance Directory; Current Edition.
- X. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; current edition.
- Y. IMIAWC (CW) - Recommended Practices & Guide Specifications for Cold Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.
- Z. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit two samples of facing brick units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 MOCK-UP

- A. Construct a masonry wall as a mock-up panel sized 4 feet long by 4 feet high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.
- B. Mock-up may not remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
 2. Special Shapes: Provide non-standard blocks configured for corners.
 3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block, as indicated.
 - b. Type 1 - Moisture - controlled, normal weight, unless otherwise indicated.
 - c. Exposed Faces: Manufacturer's standard color and texture where indicated.

2.02 BRICK UNITS

- A. Manufacturers:
 1. Endicott Clay Products Co: www.endicott.com.
 2. Substitutions: See section 01 6000 - Product Requirements.
- B. Facing Brick: BR-1, ASTM C216.

1. Color and texture: **Endicott Clay Products - Manganese Ironspot, Smooth, Modular.**
2. Nominal size: 3-5/8 inches by 2-1/4 inches by 7-5/8 inches.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C91/C91M, Type S.
 1. Colored Mortar: Premixed cement as required to match Architect's color sample.
 2. Manufacturers:
 - a. Basis of Design PROMIX, Color to be selected from manufactures full range of available colors.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
 1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Mortar Aggregate: ASTM C144.
- E. Grout Aggregate: ASTM C404.
- F. Water: Clean and potable.

2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 1. Hohmann & Barnard, Inc: www.h-b.com/sle.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa), deformed billet bars; galvanized.
- C. Single Wythe Joint Reinforcement: Ladder type; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc; Product 120 Truss-Mesh: www.h-b.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
 1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
 2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
 3. Vertical adjustment: Not less than 3 inches.
 4. Manufacturers:
 - a. Hohmann & Barnard, Inc.; Product DW-10HS: www.h-b.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 FLASHINGS

- A. Prefabricated Metal Flashing: fabricated 26 ga, 0.0747 inch stainless steel (type 304) flashing for thru-wall conditions.
 1. Manufacturers:
 - a. Hohmann & Barnard, Inc; Product: FTSA Drip Plate (with optional fabricated corner pieces): www.h-b.com.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

- B. EPDM Thru-Wall Flashing:
 - 1. Thickness: 40 mil.
 - 2. Width: 12 inches through 36 inches
 - 3. Tensile Strength, ASTM D412: Not less than 1305 psi
 - 4. Elongation, ASTM D412: Not more than 300%.
 - 5. Tear Resistance, ASTM D624: Not less than 150 pound-force/inch
 - 6. Ozone Resistance, ASTM D1140: No cracks.
 - 7. Heat Aging, ASTM D573: Not more than 1205 psi
 - 8. Brittleness Point, ASTM D2137; Minus 49 degrees F
 - 9. Water Absorption, ASTM D471: Plus 8% to minus 2%.
 - 10. Manufacturer: Hohmann & Barnard, Inc, Product: EPRA-MAX Thru-Wall Flashing
 - a. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 ACCESSORIES

- A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc.; Product Mortar Trap.
 - 2) Substitutions: See Section 01 6000 - Product Requirements.
- B. Weeps:
 - 1. Type: Molded PVC grilles, insect resistant.
 - 2. Color(s): As selected by Architect from manufacturer's full range.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc: www.advancedbuildingproducts.com/#sle.
 - b. Blok-Lok Limited: www.blok-lok.com/#sle.
 - c. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Termination Bar: Used at top of flashing to mechanically secure it to the backup.
 - 1. Size: 1/8 inch thick by 1 inch wide by 8 feet long with 1/4 inch diameter holes spaced at 8 inches on center.
 - 2. Finish: Stainless steel, Type 304
 - 3. Manufacturer:
 - a. Hohmann & Barnard, Inc., Product: T1 Termination Bar
 - b. Substitutions: See Section 01 6000 - Product Requirements.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Masonry below grade and in contact with earth: Type S.
 - 2. Exterior, loadbearing masonry: Type N.
 - 3. Exterior, non-loadbearing masonry: Type N.
 - 4. Interior, loadbearing masonry: Type N.
 - 5. Interior, non-loadbearing masonry: Type O.
- B. Colored Mortar: To be selected from manufactures full range of available colors. Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of TMS 402/602 or applicable building code, whichever is more stringent.

3.04 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.
- D. Brick Units:
 - 1. Bond: Running.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- C. Remove excess mortar and mortar smears as work progresses.
- D. Interlock intersections and external corners.
- E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 16 inches (406 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 12 inches.

3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 12 inches.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- B. Place continuous joint reinforcement in first and second joint below top of walls.
- C. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

3.11 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 12 inches, minimum, to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Extend EPDM flashings to within 1/4 inch (6 mm) of exterior face of masonry.
- D. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.12 GROUTED COMPONENTS

- A. Reinforce bond beams with bars, as indicated on the drawings 1 inch from bottom web.
- B. Reinforce columns with bars as indicated on the drawings
- C. Lap splices minimum 24 bar diameters.
- D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- E. Place and consolidate grout fill without displacing reinforcing.
- F. At bearing locations, fill masonry cores with grout for a minimum 16 inches (300 mm) either side of opening.

3.13 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.

- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Form expansion joint as detailed on drawings.

3.14 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

3.15 TOLERANCES

- A. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- B. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- C. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- E. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.16 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

3.18 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

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**SECTION 05 50 00
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel items.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 12 00 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 05 51 00 - Metal Stairs.
- E. Section 05 52 13 - Pipe and Tube Railings.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- J. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- L. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- M. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- N. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- O. SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

- C. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. See structural general notes on sheet S001.
- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Structural Connections: As detailed, prime and paint finish.
- C. Lintels: As detailed; galvanized finish.
- D. Handrailing: As detailed, prime and paint finish.
- E. Guardrails: As detailed, prime and paint finish.

2.04 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for epoxy finish and high performance polymer painted finish.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.

- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

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**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exposed timber structural framing.
- B. Non-structural dimension lumber framing.
- C. Sheathing.
- D. Miscellaneous framing and sheathing.
- E. Concealed wood blocking, nailers, and supports.
- F. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2022.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- E. AWPA U1 - Use Category System: User Specification for Treated Wood; 2023.
- F. PS 1 - Structural Plywood; 2023.
- G. PS 2 - Performance Standard for Wood Structural Panels; 2018.
- H. PS 20 - American Softwood Lumber Standard; 2021.
- I. SPIB (GR) - Standard Grading Rules; 2021.
- J. WWPA G-5 - Western Lumber Grading Rules; 2021.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Samples: For rough carpentry members that will be exposed to view, submit two samples, _____by_____ inch in size illustrating wood grain, color, and general appearance.
- D. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Spruce-Pine-Fir (South) #2 or better, unless otherwise indicated.
 - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
 - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
- B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.

2.03 EXPOSED DIMENSION LUMBER

- A. Grading Agency: Western Wood Products Association; WWPA G-5.
- B. Sizes: Nominal sizes as indicated on drawings.
- C. Surfacing: S4S.
- D. Moisture Content: S-dry or MC19.
- E. Stud Framing (2 by 2 through 2 by 6):
 - 1. Species: Western Cedar.
 - 2. Grade: Clear.
- F. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 - 1. Species: Western Cedar.
 - 2. Grade: Select Heart.
- G. EXPOSED TIMBERS
 - 1. Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
 - 2. Moisture Content: Kiln-dry (20 percent maximum).
 - 3. Surfacing: S4S.
 - 4. Species: Western Cedar.
 - 5. Grade: Clear Heart Structural.
- H. CONSTRUCTION PANELS
 - 1. Wall Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - a. Span Rating: 32/16.
 - b. Thickness: As noted on the drawings.
- I. ACCESSORIES
 - 1. Fasteners and Anchors:
 - a. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Water-Resistive Barrier: As specified in Section 07 25 00.
- J. FACTORY WOOD TREATMENT

1. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - a. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
2. Preservative Treatment:
 - a. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - 1) Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - 2) Treat lumber exposed to weather.
 - 3) Treat lumber in contact with roofing, flashing, or waterproofing.
 - 4) Treat lumber in contact with masonry or concrete.
 - b. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
 - 1) Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - 2) Treat plywood in contact with roofing, flashing, or waterproofing.
 - 3) Treat plywood in contact with masonry or concrete.

PART 3 EXECUTION

3.01 PREPARATION

- A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.
- B. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

3.04 INSTALLATION OF CONSTRUCTION PANELS

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws.

3.05 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 74 19 - Construction Waste Management and Disposal.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

**SECTION 07 25 00
WEATHER BARRIERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vapor Retarders: Materials to make exterior walls and joints around frames of openings in exterior walls water vapor resistant and air tight.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- C. Section 32 32 73 - Joint Sealers: Sealing building expansion joints.

1.03 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.

1.04 REFERENCE STANDARDS

- A. AATCC Test Method 127 - Test Method for Water Resistance: Hydrostatic Pressure; 2018, with Editorial Revision (2019).
- B. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension; 2016 (Reapproved 2021).
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.
- E. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2022a, with Editorial Revision (2023).
- F. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

1.06 QUALITY ASSURANCE

- A. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
- B. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
- C. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- D. Pre-installation Meeting:
 - 1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Installer and weather barrier manufacturer's designated representative.
 - 2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.07 MOCK-UP

- A. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - 1. Mock-up size: As required by the Air Barrier Manufacturer.
 - 2. Mock-up Substrate: Match wall assembly construction, including window opening.
 - 3. Mock-up may remain as part of the work, if approved by the Air Barrier Manufacturer.

1.08 FIELD CONDITIONS

- A. Store weather barrier materials as recommended by weather barrier manufacturer.

1.09 WARRANTY

- A. Air barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
- B. Pre-installation meetings and jobsite observations by air barrier manufacturer for warranty is required prior to assembly installation

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
 - 1. On outside surface of sheathing of exterior walls use air barrier sheet, mechanically fastened type.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
 - 1. Air Barrier Coating:
 - a. Material: 100 percent silicone.
 - b. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
 - c. Water Vapor Permeance: 18 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.
 - d. Elongation: 300 percent, minimum, when tested in accordance with ASTM D412.
 - e. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - f. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
 - g. VOC Content: 100 g per L or less.

- h. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
- i. Manufacturers:
 - 1) Dow Chemical Company; DOWSIL DefendAir 200: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - 2) DuPont de Nemours, Inc; Tyvek Fluid Applied WB+ with Tyvek Fluid Applied Flashing and Joint Compound, Sealant for Tyvek Fluid Applied System and StraightFlash: www.dupont.com/#sle.
 - 3) Henry Company; Air-Bloc All Weather STPE: www.henry.com/#sle.
 - 4) Master Builders Solutions by BASF; MasterSeal AWB 660: www.master-builders-solutions.basf.us/en-us/#sle.
 - 5) Momentive Performance Materials, Inc/GE Construction Sealants; GE Elemax 2600 AWB: www.siliconeforbuilding.com/#sle.
 - 6) Soprema; SopraSeal LM 202VP: www.soprema.us
 - 7) Substitutions: See Section 01 60 00 - Product Requirements.

2.03 AIR BARRIER MATERIALS (AIR AND VAPOR BARRIER)

2.04 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Sheet: Polyimide film vapor retarder for use with unfaced, vapor permeable glass fiber and mineral wool insulation in wall cavities. Material has a permeance of 1 perm or less when tested to ASTM E 86, dry cup method and increases to greater than 10 perms using the wet cup method.
 - 1. Water Vapor Permeance:
 - a. ASTM E 86, dry cup method: 1.0 perms (57ng/Pa*s*m2).
 - b. ASTM E 86, wet cup method: 10.0 perms (1144ng/Pa*s*m2).
 - 2. Fire Hazard Classification: ASTM E 84:
 - a. Maximum Flame Spread Index; 20.
 - b. Maximum Smoke Developed Index; 55.
 - 3. Acceptable Products:
 - a. CertainTeed; MemBrain Vapor Retarder & Air Barrier Film: www.certainteed.com/insulation.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
 - 1. Manufacturers:
 - a. DuPont de Nemours, Inc; FlexWrap NF: www.dupont.com/#sle.
 - b. DuPont de Nemours, Inc; StraightFlash: www.dupont.com/#sle.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Sheet Membrane Mounting Tape: Double-sided strip of pressure-sensitive, acrylic adhesive reinforced with embedded fiber-strand carrier layer and plastic backing.
 - 1. Width: 3/4 inch.
 - 2. Roll Length: 164 feet.
 - 3. Thickness: 14 mil, 0.014 inch.
 - 4. Manufacturers:
 - a. As recommended by vapor retarder sheet manufacturer..

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Anchor to metal framing using seam tape, adhering at least one-half of tape width to substrate.
 - 2. Where conduit, pipes, wires, ducts, outlet boxes, and other items are installed in insulation cavity, pass vapor retarder sheet behind item but over insulation and maintain air tight seal.
- D. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Use flashing to seal to adjacent construction and to bridge joints.
- E. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
 - 3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
 - 4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
 - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
 - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- C. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples 4 by 4 inch in size illustrating metal finish color.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with five years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
 - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As selected by Architect from manufacturer's standard colors.

2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.03 GUTTER AND DOWNSPOUT FABRICATION

- A. Conductors: Profile as indicated.
- B. Downspouts: Rectangular profile.
- C. Conductors and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.
- E. Downspout Extenders: Same material and finish as downspouts.
- F. Seal metal joints.

2.04 EXTERIOR PENETRATION FLASHING PANELS

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

2.05 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- E. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Exterior Flashing Receivers: Install in accordance with manufacturer's recommendations, and in proper relationship with adjacent construction, and as follows:
 - 1. Secure receiver at perimeter of wall opening with adhesives or fasteners.
- E. Seal metal joints watertight.
- F. Secure conductors and downspouts in place with concealed fasteners.
- G. Set splash pads under downspouts.

3.04 FIELD QUALITY CONTROL

- A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

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SECTION 12 93 00
SITE ACCESSORIES

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 this section.
 - 1. See Section 00 73 00 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Site Accessories as indicated on the plans and as herein specified.
- B. This Section includes the following:
 - 1. Basketball Equipment
 - 2. Sand Volleyball Equipment
 - 3. Park Shelter

1.3 SUBMITTALS

- A. Provide submittals in accordance with Section 01 33 00
- B. Product data
 - 1. Manufacturer's standard product literature
 - 2. Shop drawings
 - 3. Installation instructions
 - 4. Maintenance instructions

1.4 QUALITY ASSURANCE

- A. Manufacture Qualifications
 - 1. Minimum 15 year's experience in the manufacture of site furnishing and amenities

1.5 PROJECT CONDITIONS

- A. Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of site accessory items.

2. PRODUCTS

2.1 PRODUCTS

A. Basketball Equipment:

1. Manufacture:

- a. Bison, Inc (800) 247-7668, www.bisoninc.com
- b. Or equal, if and as specifically approved by Architect by Addendum during bidding period.

2. Model: BA871-BK

3. Size: 42x60

4. Mounting: Per manufacture recommendations

5. Pad Color: from manufacture standard chart

6. Quantity: 2

B. Outdoor Volleyball Equipment

1. Manufacture:

- a. Bison, Inc (800) 247-7668, www.bisoninc.com
- b. Or equal, if and as specifically approved by Architect by Addendum during bidding period.

2. Model: SVB5000A-BK

3. Mounting: Per manufacture recommendations

4. Quantity: 1

C. Park Shelter

1. Manufacture:

- a. Poligon, Inc (www.poligon.com)

1) Local Rep: Julie Conradson – Crouch Recreation 402-238-6761

- b. Or equal, if and as specifically approved by Architect by Addendum during bidding period.

2. Model: RAM 16 x 24

3. Roof Type: Multi-Rib

4. Frame Color: Arctic Ice

5. Roof Color: Match Valley's logo blue (assumed 48/96/149 RGB)

6. Mounting: Per manufacture recommendations

7. Quantity: 3

3. EXECUTION

3.1 INSTALLATION

- A. Install site accessories in accordance with manufacturer's instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored, and at locations as indicated on drawings.

3.2 ADJUSTING AND CLEANING

- A. Adjust site accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

END OF SECTION

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**SECTION 26 00 00
ELECTRICAL WORK**

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Extent of electrical work is indicated by drawings and schedules and by requirements of this section. Work includes the following:
- B. General Work: The work associated with electrical systems and equipment to be performed as electrical work includes excavating, conduit sleeves, conduit supports, anchors, lighting, power, miscellaneous systems, identification, coordination of drawings, record drawings, permits, tests, inspection, training of Owner's operating personnel, producing operating and maintenance manuals, and construction permits.
 - 1. Lighting: The extent of lighting work construction is indicated in the contract documents by E-Series drawings. These items of work include lighting fixtures, conduit, wire, panels, boxes, and miscellaneous work associated with the delivery and installation of such equipment.
 - 2. Power: The extent of the power work is indicated in the contract documents by E-Series drawings. This work includes conduit, wire, boxes, receptacles, panels, and all equipment required for a complete installation. Wiring of equipment furnished by other specification Divisions or by the Owner that requires electrical power connections shall be wired in accordance with manufacturer's instructions.
- C. Refer to Section 31 23 33 for trenching, excavating and backfilling required in connection with the underground telephone, television and electrical service. This work to be performed as part of the electrical contract.

1.02 QUALITY ASSURANCE

- A. General: In addition to complying with local codes, ordinances, standards and regulations, comply with:
 - 1. Independent Testing Laboratories (ITL)
 - 2. Electrical Testing Laboratories (ETL)
 - 3. Factory Mutual (FM)
 - 4. Institute of Electrical and Electronic Engineers (IEEE)
 - 5. Underwriters' Laboratories, Inc. (UL)
 - 6. National Fire Protection Association (NFPA)
 - 7. American Society for Testing and Materials (ASTM)
 - 8. American National Standards Institute (ANSI)
 - 9. National Electrical Code (NEC)
 - 10. National Electrical Safety Code (NESC)
 - 11. Insulated Power Cable Engineers Association (IPCEA)
 - 12. American Institute of Steel Construction (AISC)
 - 13. State & Municipal Codes in Force in the Specific Project Area
 - 14. Occupational Safety and Health Association (OSHA)

1.03 SUBSTITUTIONS

- A. Pre-Bid Substitution Requests: Unless indicated otherwise, in general, products indicated are a basis of design and pre-bid substitutions are allowed per the requirements of the specifications and the Instructions to Bidders.
1. If a specific product is listed without an “or approved equal/equivalent” clause, then the product listed shall be the product provided. This is generally restricted to products in which compatibility with other equipment or existing equipment is necessary.
 2. If a specific product is specified without a Basis of Design manufacturer and product catalog number/series, or a list of approved manufacturers then a pre-bid substitution request is not required.
- B. Lighting fixtures: Lighting fixture substitutions are allowed unless specifically indicated. Substitutions will be evaluated as part of the shop drawing process. Pre-bid substitutions will not be considered or evaluated. Fixtures indicated are a basis of design and establish the quality of product, listings and certifications, lighting distributions, options and accessories, and finishes. It is the responsibility of the supplier to make selections that are equal or equivalent for each substituted fixture. It is the responsibility of the supplier and Contractor that all necessary options are included in the bid cost so that a substitution may be installed at no post-bid additional cost to the Owner.
1. If lighting fixture substitutions are proposed for the pickleball courts, it shall be the responsibility of the contractor and the fixture supplier to provide an updated lighting layout utilizing fixture specific photometric files. Layouts shall show updated footcandle levels with proposed substitution fixture to prove that adequate lighting is being provided for the following areas:
 - a. Pickleball Court:
 - (1) Class IV Recreational Play
 - (2) Average Horizontal Illuminance = 30 fc
 - (3) Uniformity = 2.0:1 or better (max/min)
 - (4) Grid = 6' x 6' (3' elevation, extending 6' beyond sidelines and 10' beyond baselines)
 - (5) LLF = 0.85

1.04 SUBMITTALS

- A. General: The Contractor shall submit to the Engineer, for approval, electronic PDF copies of shop drawings of all major items of equipment and/or systems, giving manufacturer's name, catalog numbers, etc., and shall in particular set forth any variation or substitution from that intended by plans and specifications. Submittals shall consist of a Bill of Materials for major items included in the submittal, manufacturer's catalog page indicating general features and listings, and shop drawings. Electronic PDF files shall be text searchable and include bookmarks for major sections for ease of navigation.
- B. Shop drawings shall be submitted for review for the following:
1. Panels
 2. Lighting Fixtures
 3. Court Lighting Controller
- C. Operational & Maintenance Manuals: Provide O & M Manuals in accordance with specifications.
1. Provide manufacturer's O & M or instruction Manuals for light fixtures, lighting control devices (excluding toggle switches), panelboards, etc.

2. In addition to paper copies, an electronic version shall be provided in PDF format. The PDF file shall be text searchable and organized the same as paper copy complete with bookmarks for each indexed tab section.

1.05 COORDINATION OF ELECTRICAL WORK

- A. Coordination of Work: The Contractor shall be responsible for the coordination electrical work with the work all other suppliers and installers for this Project.
- B. Coordinate and install wiring for appliances and systems furnished under other specification Divisions, furnished by the Owner, Bid Packages or in some instances furnished under separate Contract. It is the intent of this requirement, that anything with an electrical connection will have power, and be working properly at Substantial Completion unless indicated otherwise. Verify outlet box sizes for various components such as wall switches and indicators. Install electrical wiring in accordance with manufacturer's instructions.
- C. For some items that are provided for this Project provided by others, product substitutions may result in changes to the electrical systems indicated. When Contractor initiated product variations result in electrical system changes, coordinate those changes at no additional cost to the Owner.
- D. The Electrical Contractor shall be responsible for coordinating the electrical requirements of items provided under Division 26. Make field adjustments as necessary for variations in product requirements provided under Division 26 at no additional cost to the Owner.
- E. Coordinate service outages of the service utilities with the Owner and General Contractor for proper sequencing of work and for protection of the Owner's operations.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle all electrical equipment carefully to prevent breakage, denting, and scoring finishes.
- B. Deliver all electrical equipment in factory fabricated fiberboard type containers.
- C. Store all equipment to be installed on the job that is stored on the site for any period of time shall be protected from the weather in a manner acceptable to the Engineer. All conduit shall be stored off the ground to insure that no dirt or debris is allowed to enter them before installation. Failure to store material correctly shall be just cause for the Architect to direct the Contractor to remove the material from the site.

1.07 PERMITS AND FEES

- A. The Contractor shall familiarize himself with all requirements as to permits, fees, codes and ordinances, etc., and arrange to comply with them.
- B. All permits, licenses, fees, inspections, and arrangements required for the work under this contract shall be obtained by the Contractor at his expense.
- C. The Contractor shall field coordinate and provide all temporary power required.

1.08 CODES

- A. All work shall be in accordance with applicable State and Local Codes. All work shall comply with the rules and recommendations of the National Fire Protection Association, all requirements of local utility companies, and the State Fire Inspection Bureau. These codes, rules, recommendations, and requirements shall take precedence if the drawings and specifications are not in conformance therewith.

1.09 LABELS AND IDENTIFICATION

- A. Equipment Identification: All identification labels shall be installed in a neat and workmanlike manner. Cleans surfaces prior to installation.
- B. Wiring:
 1. All control wires shall have self-adhesive wraparound type identification labels at each panel, enclosure, and termination. Labels shall be machine printed by

thermal transfer or equivalent process. Identification of each wire shall be unique and shall match terminals within the control panel.

- C. Panelboards: All panelboards shall have a machine printed, flexible self-adhesive vinyl label with the following identifications:
 - 1. A label with the available short-circuit current shall be included on each panelboard, switchboard, switchgear, and motor control center per NEC 408.6. Contractor to verify with Engineer to provide the available short-circuit currents which incorporate shop drawing transformer impedances and field installed feeder lengths. For information provided subsequent to bidding, use the date of receipt of information.
 - 2. Ungrounded conductor color coding system per NEC 210.5.
 - 3. Label that identifies the equipment where the power originates per NEC 408.4(B).
 - 4. Arc Flash Hazard Warning per NEC 110.16. The Contractor is responsible for generic arc flash warning labels.
- D. Circuit Directories: Provide machine printed circuit directory card for the As-Built conditions for each panelboard. In lieu of a circuit directory card, it is acceptable to utilize machine printed flexible self-adhesive vinyl labels at each circuit breaker.

PART 2 - PRODUCTS

2.01 ELECTRICAL RACEWAYS

- A. General: For each electrical raceway system indicated, provide assembly of conduit, tubing or duct, and fittings, included but not necessarily limited to, connectors, couplings, off sets, elbows, straps, bushings, expansion joints, hangers, and other components and accessories as needed for a complete system. Minimum size of conduit shall be 3/4 inch. All conduit shall be new.
- B. RMC: Rigid steel conduit complying with ANSI C80.1 shall be listed to UL 6, standard weight, mild-steel, hot-dipped galvanized or sherardized inside and out.
- C. LFMC shall have continuous copper content or separate grounding conductor, shall be listed to UL 360 and shall be "Seal-Tite" Type "UA," as manufactured by Anaconda or the approved equal. The connections shall be a maximum of 24 inches in length.
- D. Nonmetallic: Rigid non-metallic conduit shall be PVC schedule 40 or 80 PVC conduit, NEMA TC 2, listed to UL 651 and listed for direct sunlight. 90° bends shall utilize schedule 80 conduit to prevent burn through during pulling.
 - 1. RTRC: Fiberglass Reinforced Thermosetting Resin Conduit (RTRC), heavy wall Type XW may be used in lieu of PVC. Raceway shall be listed to UL 2525 and UL 94 HB.
- E. Each length of conduit shall be stamped with the name or trademark of the manufacturer and shall bear the Underwriter's label.

2.02 RACEWAY FITTINGS

- A. All raceway fittings shall be listed to UL 514B.
- B. Coupling and connections in non-hazardous areas (steel) for thin wall conduit shall be compression type. For outdoor or wet locations couplings shall also be rain tight, and concrete-tight. Indent or set screw type fittings shall not be used. Fittings for rigid conduit shall be threaded. Fittings for liquid tight flexible conduit shall be liquid tight. Unless noted otherwise, die-cast fittings in whole or part shall not be acceptable.
- C. Bushings and lockouts for galvanized steel raceway shall be made of galvanized malleable iron and shall have sharp clean-out threads for rigid conduit. Compression type shall be used for EMT.
- D. Expansion joint fittings shall be Type XJ/XJG-long or other conduit fittings as manufactured by Crouse-Hinds or equal for RMC and IMC. Use PVC expansion joints

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with length of travel suitable for 120°F temperature differential and the length of raceway for non-metallic raceways.

2.03 RACEWAY SUPPORT

- A. Galvanized Steel Support Systems: Structural-grade, factory formed, galvanized steel channels and angles with 9/16 inch diameter holes at a maximum of 8 inches o.c. in at least 1 surface.
 - 1. Fitting and Accessory materials: Same as channels and angles. Stainless steel may also be used.
 - 2. Rated Strength: Selected to suit applicable load criteria.

2.04 CONDUCTORS

- A. A complete system of copper conductors shall be installed in a raceway system with green ground wire throughout the building for all feeder and branch circuits, etc. Wire shall be copper, 600-V minimum rating, except for special systems. No wire smaller than No. 12 gauge shall be used, except for signal or control systems, or where otherwise indicated.
- B. Insulation Types:
 - 1. #10 and smaller shall be Type THWN-2 rated for 90°C.
 - 2. #8 and larger shall be Type THWN-2 or XHHW-2 rated for 90°C.
 - 3. Control Wiring shall be Type XHHW-2 rated for 90°C.
- C. Cables shall conform to the requirements of the Underwriter's Laboratories, Inc and shall be listed by a Nationally Recognized Testing Laboratory. THWN-2 cable shall be listed to UL 83. XHHW-2 cable shall be listed to UL 44.
- D. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacture and shall not be older than 12 months.
- E. Color Coding: All wiring shall be color-coded throughout its entire length.
 - 1. 1 phase SN 120/240V
 - a. Line 1 – Black
 - b. Line 2 – Red
 - c. Neutrals –White
 - d. Ground – Green
- F. Conductor Splices and Taps:
 - 1. Interior and Dry Locations:
 - a. Splicing of Conductors #10 AWG or smaller shall be by one of the following methods:
 - (1) Conductors shall be twisted together and soldered. All uninsulated splices, joints and free ends of conductors shall be covered with heat shrink rubber insulating sleeve or equal.
 - (2) Preinsulated spring-pressure connectors, such as "Scotch-lok" or equal.
 - b. Splicing and Termination of Conductors #8 AWG or larger:
 - (1) Conductors shall be connected using insulated secondary set-screw connectors. Connector Manufacturing Co. Type NACC or approved equal.
 - (2) Connection to ground conductors No. 1/0 AWG and larger shall be cast by Cadweld, or Burndy "Thermoweld", fusible-metal process.

2. Wet Locations: Unless indicated otherwise, conductor splices and taps in wet locations shall utilize connectors listed to UL 486D for wet locations.
 - a. Splicing of conductors in lighting pole bases shall be connected using insulated secondary set-screw connectors suitable for Wet Locations and listed to UL 486D. Connector Manufacturing Co. Type SSBC series or approved equal.
3. The connection to a fixture lead may be made by use of connectors described above or by means of a set-screw connector such as Ideal or equal.

2.05 PANELBOARDS

- A. All equipment shall be the product of one manufacturer as manufactured by Square D, General Electric, Cutler Hammer or Siemens.
- B. All panelboards shall be listed to UL 67. All panels shall be dead front with circuit breakers and copper buses in accordance with schedule and notations on the electrical drawings.
- C. All busses shall be silver-plated copper, or tin-plated copper.
- D. Overcurrent Protective Devices: Unless indicated otherwise, overcurrent protective devices shall be molded case type circuit breakers. Circuit breakers shall comply with and be listed to UL 489. The individual breakers shall be calibrated and sealed to eliminate tampering or unauthorized changes in calibration. Breakers shall be interchangeable and capable of being operated in any position.
 1. Individual circuit breakers shall be fully rated for the available short-circuit rating of the panelboard, series ratings are prohibited.
 2. Two-pole and three-pole branch breakers shall be single-handle, common trip type. 15 and 20 amp breakers shall be (SWD) switching duty rated. All branch breakers shall be 20 amp one-pole unless indicated otherwise.
 3. Where circuit breakers are indicated to be GFCI type, they shall be listed to UL 943, Class A, with a trip at 4-6 mA.
- E. A suitable directory or card holder shall be mounted on the inside of each cabinet door. Each circuit thereon shall bear a typewritten notation covered with transparent celluloid designated exactly what it controls. These cards shall be made out after the circuits have been connected.
- F. Enclosures: Cabinets, wiring gutters, etc., shall be in strict accordance with the standard practice of the NEMA and the National Electric Code. All panels shall be flush or surface mounted as shown on the drawings. Provide the NEMA environmental rating suitable for the environment or as indicated.
 1. Doors shall have concealed hinges.
 2. Panel and trim shall be factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 3. Back Boxes: Unless indicated otherwise, galvanized steel.
- G. Lighting and Appliance Panelboards:
 1. NEMA PB 1, lighting and appliance branch-circuit type.
 2. Doors shall be secured with flush latch with tumbler lock. All panelboards on a project shall be keyed alike.
 3. All Lighting Panels shall be 120/240V single phase 3 wire, main breaker as indicated, and bolt-on branch breakers as indicated. Minimum short-circuit rating as indicated, but not less than 10 kAIC. Square D type QO or equal.

2.06 WIRING DEVICES

- A. General: Provide factory-fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and complying with NEMA Stds. Pub. No. WD 1. Receptacles shall be listed to UL 498. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and complying with NEC and NEMA standards for wiring devices. Provide devices and cover plates as indicated; color selection to be verified by Contractor with Architect/Engineer.
- B. GFCI Receptacles: Comply with NEMA Stds. Pub No WD1 as follows:
 - 1. GFCI: Provide specification duplex, ground fault circuit interrupter receptacles, termination type, capable of protecting connected down stream receptacles on single circuit, grounding type, UL 943 rated Class A, Group 2, 20-ampere rating, 125-volts, 60-Hz; with solid state ground fault sensing and signaling; with 5 milliampere ground fault trip level; equipped with 20-ampere plug configuration, NEMA 5-20R. See plan for symbol indicating GFI receptacle grade.
 - a. Ground Fault Circuit Interrupted Type
 - b. 2-pole, 3-wire grounded
 - c. 20 Amp, 125 Volt
 - d. Specification Grade
 - e. Leviton No. 6898-G, Gray
- C. All weather proof cover plates shall be "In-Use" type that are raintight while in use and shall be die-cast zinc weather resistant. Provide neoprene type gaskets. Provide Intermatic model WP1010MXD or equal.

2.07 LIGHTING FIXTURES

- A. The Contractor shall furnish and install all new lighting fixtures including lamps as shown on the drawings.
- B. All lighting fixtures including lamp holders and all electrical components shall be listed and labeled by an Nationally Recognized Testing Laboratory (NRTL) to meet UL 1598. All fixtures shall comply with article 410 of the N.E.C.
- C. LED Luminaires: LED's shall be UL 8750 recognized or listed as applicable. Luminaires shall be tested in accordance with IES LM-79 and IES LM-80. Luminaires shall have a useful life of minimum of 50,000 hours at 70% lumen maintenance calculated based on IES LM-80 test data.
- D. Provide products as listed in the fixture schedule or an approved equal. Substitutions will be evaluated as part of the shop drawing process. Fixtures indicated are a basis of design and establish the quality of product, listings and certifications, lighting distributions, options and accessories, and finishes. If the proposed substitution is considered not equal or rejected by the Engineer, then provide the scheduled fixture at no additional cost.

2.08 LIGHTING CONTROLS

- A. Control Narrative:
 - 1. Pickleball Court Lighting: Pickleball court lighting shall be controlled through a lighting contactor within the UL 508A listed Court Lighting Control Cabinet. The cabinet shall have a hand-off-auto switch in a locked inner door, accessible to city staff only. Hand mode shall allow for constant on operation to bypass automatic off controls. Auto mode shall allow the use of pushbuttons located on the outside door to control the lighting, accessible to the public. The "on" pushbutton shall engage the lights. The lights shall turn off through the "off" pushbutton, or shall automatically turn off through an adjustable timed relay. The cabinet shall also be equipped with a mechanical time switch to prevent public operation of the lights during park closed hours.

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- B. Control Components:
1. U.L. Approval: All control panels shall be constructed in compliance with Underwriter's Laboratories Industrial Control Panels listing and shall utilize listed and recognized components by a Nationally Recognized Testing Laboratory (NRTL). The panel shall bear the Underwriter's Laboratory label stating that it was built listed to UL 508A.
 2. Control Cabinet Enclosure:
 - a. NEMA 3R, outdoor rated, surface mount, pad-lockable.
 - b. Dimensions shall be determined by the Contractor to coordinate location of all devices for proper clearances.
 - c. The control panel enclosure shall have a separate inner door. The inner door shall be a minimum of .080" steel and shall be hinged. Inner door shall be latched with tool-less quarter turn latches.
 3. Contactors: Electrically held, complying with NEMA ICS 2, and listed to UL 508. When housed in a control panel, open style contactors are acceptable.
 4. Time Switches: Listed to UL 508 or UL 916. All time switches shall be as manufactured by Tork, Intermatic, or Zenith. Provide 7 day astronomical digital time switch, 240VAC, housed in NEMA 1 enclosure or better. Has daylight savings time adjustment.
 5. Control Switches & Pushbuttons:
 - a. Control switches shall be heavy duty industrial grade, oil tight design, positions as required.
 - b. Contact rating shall conform to NEMA A-600 designation.
 - c. Approved Manufacturers:
 - (1) Allen Bradley Type 800T/800H
 - (2) Square D Class 9001 Type K
 - (3) GE Type CR104P
 - (4) Cutler-Hammer/Eaton 10250T Series.
 6. Control/Timer Relays:
 - d. Plug-in type with dust cover, socket and locking spring when relay mounted horizontally.
 - (1) Coil: continuous operation at 120 VAC +10% unless shown otherwise.
 - (2) Contacts, 3 pole, double throw, minimum
 - (3) 10 amps (unless shown otherwise), make-break, 120 VAC, resistive.
 - (4) Insulation resistance: 1000 megohms at 500 VDC.
 - (5) Dielectric: 2000 VAC, 60 Hz
 - e. Operating time:
 - (1) 34 milliseconds (nominal) energization
 - (2) 100 milliseconds (nominal) de-energization
 - (3) Mechanical Life: 10,000,000 operations
 - (4) Temperature: 0° to 70°C
 7. Cabinets, wiring gutters, etc., shall be in strict accordance with the standard practice of NEMA guidelines and the National Electrical Code.

2.09 LIGHTING POLE BASE OVERCURRENT PROTECTION

- A. Provide and install inline fuses Bussmann series complete with watertight in line fuse holders Types 'HEB' or 'HEY' and waterproof insulating boots on each end with cartridge fuses Type KTK, 15 amp. Provide fuseholders in each energized phase conductor going up the pole shaft to the fixture or receptacle. Use double-pole fuse holders for Line-To-Line circuits.

2.10 LIGHT POST REINFORCED CONCRETE FOUNDATIONS

- A. Concrete shall be 47B-3500 concrete in accordance with NDOR standards specifications.
- B. Furnish high quality, standard deformed reinforcing bars of the sizes called for in the Drawings, using minimum 40,000 psi yield bars according to ASTM standards applicable for reinforcing steel bars.
- C. Anchor bolt patterns shall be field coordinated with the pole manufacturer. Obtain and use anchor bolt template from manufacturer prior to pouring concrete foundations.
- D. Use anchor bolts or tie rods sent for each pole by manufacturer of the poles. Use checking templates to create sturdy, substantial and accurate template cages for top and bottoms of bars in each footing.
- E. Furnish standard radius conduit sweeps for stub-ups into each pole base of the same size and manufacture use in conduit systems. Use proper couplings, bells and/or bushings, taking care to set projections into bases true and plumb, tied in the reinforcement cages securely and accurately.

PART 3 - EXECUTION

3.01 ELECTRICAL WORK, GENERAL

- A. All electrical work shall be done in a neat and workmanlike manner as defined by NECA 1 "Standard Practices for Good Workmanship in Electrical Contracting".
- B. Installation of electrical systems, equipment and raceways shall be done in accordance with the latest version of the appropriate NECA standard.
 - 1. Installation of panelboards shall be in accordance with NECA 407.
- C. GFCI Receptacles and Devices: Unless specifically noted otherwise, GFCI receptacles shall be wired with the line side terminals only so that a ground fault trip only de-energizes that receptacle and allows other receptacles on the same branch circuit to remain energized.

3.02 EQUIPMENT SUPPORT

- A. Application of Support Systems: Unless noted otherwise, types of raceway and equipment support systems shall be as follows:
 - 1. Outdoors and Exterior Environment: Galvanized steel strut and raceway support system.
- B. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Existing Concrete: Expansion anchor fasteners.
 - 4. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units. In corrosive environments, bolts shall be stainless steel.
 - 5. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 6. To Light Steel: Sheet metal screws.

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7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- C. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.03 MINIMUM BRANCH CIRCUITS

- A. Power Branch Circuits: Unless indicated otherwise, minimum branch circuits shall consist of #12 ungrounded conductors, #12 grounded conductor, and #12 equipment grounding conductor in ¾" raceway.
 1. Where single pole circuit breakers or fuses are used for the branch circuit overcurrent protection, use of common neutrals on multi-wire branch circuits is prohibited.

3.04 COMBINING OF CIRCUITS IN RACEWAYS

- A. Combining of Circuits in Raceways:
 1. Permissible: For power branch circuits of the same voltage, it is permissible to combine circuits in the same raceway. For these instances, the Contractor shall adjust conductor sizes in accordance with NEC de-rating factors for number of current carrying conductors in a raceway and adjust conduit sizes as necessary for raceway fill at no additional cost.
 2. Prohibited:
 - a. Unless specifically indicated on the plans, control wiring shall not be routed in the same raceway as power branch circuits or feeder circuits.

3.05 CONDUIT

- A. Electrical raceways shall be installed in accordance with NECA 101 "Standard for Installing Steel Conduit (Rigid, IMC, EMT)" and NECA 111 "Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC)" and NECA 605 "Installing Underground Nonmetallic Utility Duct".
- B. Application of Raceways: Unless noted otherwise, types of raceways shall be applied as follows.
 1. Exterior:
 - a. Above-grade: RMC.
 - b. Vibrating Equipment (Transformers and Motors): LFMC
 2. Below Grade: RNC PVC, HDPE, or RTRC-XW.
 - a. Below Grade, general: RNC Schedule 40, or RTRC-XW.
 - b. Below Grade, Under Roadways, Railroads: HDPE Schedule 80.
 - c. Embedded in Concrete: RNC-40 or RTRC-XW.
- C. RMC: Each joint shall be made up wrench tight at couplings and unions, threaded hubs of junction box, device boxes, conduit bodies, etc. All sealing fittings shall be accessible.
- D. Conduit sizes for various numbers and sizes of wire shall be as recommended by the latest edition of the National Electric Code and the latest supplements thereto. Conduit size shall be increased in size when lead-covered cable is required by the National Electric Code or this specification.
- E. No conduit shall be used where the required number and sizes of wires cannot be easily "pulled in" and the Contractor shall be responsible for the selection of the conduit sizes. Conduit sizes shown on the drawings are "minimum" sizes in accordance with appropriate tables in the National Electric Code. If because of bends of elbows a larger conduit size is required, the Contractor shall so furnish without further cost to the Owner.

- F. The entire conduit system shall be installed complete, thoroughly cleaned and all conduit fished before the wires are pulled in. Conduit shall be continuous from outlet to outlet, cabinet or junction box, and shall be so arranged that wire may be pulled in with the minimum practicable number of junction boxes.
- G. Exposed conduit shall be run in straight lines at right angles to or parallel with walls, beams or columns. In no case shall conduit be supported or fastened to other pipe, or installed to prevent the ready removal of other pipe for repairs.
- H. The ends of all conduits shall be securely plugged, and all boxes temporarily covered to prevent plaster or dirt from entering the conduits. All conduit shall be thoroughly swabbed out with a dry swab to remove moisture and debris before conductors are drawn into place.
- I. The Contractor shall be entirely responsible for the proper protection of this work from the other trades on the job. When conduit becomes bent or holes are punched through same, or outlets moved after being roughed-in, the Contractor shall repair same as directed, without additional cost to the Owner.
- J. Changes in direction shall be made by bends in the pipe wherever possible and these shall be made smooth and even without flattening the pipe or flaking the finish. Bends shall be as long radius as possible and in no case smaller than the corresponding trade elbow. Long-radius elbows shall be used where necessary.
- K. RNC and RTRC: Nonmetallic raceway bends shall be made with factory fabricated bends whenever possible. Field bends shall be made with a hot-box designed for the purpose. Field bends shall not be made using a torch or flame. Raceways with torch burn marks shall be removed and replaced.
- L. Not more than four 90 degree bends will be allowed in one raceway run. Where more bends are necessary, a conduit or pull box shall be installed. All bends in 1 inch and smaller shall be made with a conduit bender and all larger sizes shall have machine bends.
- M. Where rigid conduits enter boxes, panels, cabinets, etc., they shall be rigidly clamped to the box by a locknut on the outside, and a bushing on the inside of the box for each conduit.
- N. All conduits shall enter the box squarely.
- O. Furnish and install insulated bushings as required by NEC Article 300.4(G). The use of insulated bushings does not exclude the use of double locknuts to fasten conduit to the box.
- P. For all exterior/outdoor conduit risers from below grade to above grade shall have an expansion fitting.
- Q. Conduits shall be supported at intervals not greater than 8 feet, within 3 feet of any bend and every outlet or junction box, panel, etc. This shall apply to vertical runs as well as horizontal runs.
- R. Where conduits are run individually, they shall be supported by approved pipe straps, or beam clamps. Straps shall be secured by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; and wood screws on wood construction.
- S. No perforated straps or wire hangers of any kind will be permitted.
- T. All concrete inserts and pipe straps shall be galvanized.
- U. All steel bolts, washers and screws shall be stainless steel, galvanized, or cadmium-plated.

3.06 LUBRICANTS

- A. Where lubrication is required for pulling conductors or cables it shall be a compound specifically prepared for cable pulling and shall not contain petroleum and other products which will have a deteriorating effect on the cable insulation.

3.07 PULL WIRE

- A. A pull wire shall be installed in all empty conduits. In dry locations, pull wire shall be No. 16 gauge galvanized iron.
- B. In conduits under slab on fill below grade, or in damp locations pull wire shall be No. 12 AWG copper wire.
- C. Both ends of all pull wires shall be identified by means of labels or tags, reading "PULL WIRE" and shall be numbered to refer to the same pull wire.

3.08 EQUIPMENT GROUND

- A. Any conductor used solely for grounding purpose, equipment grounding, etc., shall be green unless bare.
- B. All wiring throughout the entire project for all of the various systems shall be furnished with a ground wire and color coded in accordance with the needs of the particular system. Wire must be color coded throughout its entire length.
- C. The practice of color coding or tagging wire ends will not be acceptable, except for feeders which shall be color coded at both ends.

3.09 INSTALLATIONS IN POLE BASES

- A. Install wiring for final use in pole bases as preparation for eventual pole setting and fixture wiring. Prepare pigtail taps and risers up poles for phase wires, equipment grounding conductors and taps, and pole grounds as shown on Drawings. Leave adequate slack (minimum 18 inches for tap to fuseholder) in each pole base to make a loop which will be long enough.

3.10 REINFORCED CONCRETE AUGERED POLE FOOTINGS

- A. Furnish and installed reinforced concrete augered style foundations, complete with finish work, reinforcement, using anchor bolts and leveling nuts and hold-down nuts designed for light poles as supplied by manufacturer and shown on the Drawings. Coordinate bolt patterns and projections with manufacturer's explicit instructions, and use solid and substantial, accurate checking templates to set bolts properly.
- B. Augered Holes: Create augered footings holes, using standard diameter augers on a digger derrick, and create neat, clean lines in the holes to at least the depths required on the Drawings for a finished hole.
- C. Preparation: Locate the footings after calling for marking the work site for conflicting utilities. It is the Contractor's responsibility to call the One-Call Service to have this done, at the Contractor's sole expense.
- D. Auger each pole footing hole plumb, and to proper depths required.
- E. Trim back the cut portions of the conduit system immediately, to neat square lines, and install standard radius conduit sweeps (90 degrees) to a height projecting into future pole base as required, and install proper couplings, bell ends or bushing ends, and adequate conduit solvent cement to provide a strong system of raceway which will also be watertight from outside moisture entry from underground water.
- F. Install the prefabricated steel reinforcement cages, taking care to chair them up by at least two inches off the floor of the footing hole, using proper chairs and spacers (do not use bricks, wire, or other "homemade" devices). Ensure that cages are held securely and tightly in proper alignment and position before pouring concrete.
- G. Install anchor bolts in proper position, and in true alignment and rotation as per manufacturer's instructions, with proper projection. Use checking templates at top and

bottom. Securely fasten all conduits, bolts, templates, leveling nuts, etc. in proper placement before pouring and call for Engineer's approval before pouring.

- H. Pour proper mixture of minimum 3500 psi (five sack mix) concrete into augered holes carefully using tremies or chutes, to avoid sides caving in, damaging the conduits, bolt patterns, etc. or moving anything and use tamping rod to consolidate the pours.
- I. Carefully screed off tops to rough grade, and carefully work around bolts so as not to damage threads, leveling or hold-down nuts. After set-up time, carefully hand trowel a medium finish to proper grade and crown of top of footing, so that a total of ½ inch drop from center to each edge is achieved, with a good close fit of pole base to the concrete. Take care to cut a beveled edge in new concrete edges with expansion joints, making a neat finished border with surrounding sidewalks. Verify that pole footing is exactly at level of surrounding sidewalks.
- J. Provide adequate protection around each pour, and ensure that concrete is kept moist and covered at all times for at least 24 hours before leaving it. Ensure that bolts remain clean of concrete slag or excess spillage when setting, and verify that bolts are set and projected properly before concrete sets.
- K. Install a ½ inch closed cell poly foam spacer felt around pole footing for a neat expansion joint. Seal top of expansion joint with self-leveling caulking.

3.11 LIGHT POLE INSTALLATION

- A. Use fabric sling for handling poles. Handle with care to protect painted finish or galvanized finish.
- B. Pole Storage: Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
- C. Retain factory-applied pole wrappings on poles until right before pole installation. Handle poles with web fabric straps.
- D. Poles Set on Foundations: The pole shall be installed on the augured concrete pole footing and leveled. Install anchor washers, lock washers, and nuts to secure post to concrete foundation. Verify post is level after post is secure.
- E. Install wiring with inline fuses. Connect ground wire to ground rod and grounding screw. Make all connections necessary for a complete and operating system as detailed on the drawings.
- F. Luminaires shall be installed in accordance with NECA 501.
- G. Use touch up paint to repair all damaged painted finishes.

END OF SECTION

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SECTION 31 10 00
SITE CLEARING

1. GENERAL

1.01 SECTION INCLUDES

- A. General:
 - 1. Remove surface debris.
 - 2. Removal of vegetation and sod.
 - 3. Remove trees, shrubs and other plants.
 - 4. Remove root system of trees and shrubs.
 - 5. Disposal.

1.02 REFERENCES

- A. State Standard Specifications, latest edition, including all current supplemental specifications.

1.03 REGULATORY REQUIREMENTS

- A. Conform to local, state, and federal regulations for disposal of debris.
- B. Contractor shall obtain, at Contractor's own expense, all permits or licenses for the use and maintaining of dumps and waste areas.
- C. Coordinate clearing work with utility Owners.
- D. Conform to local, state, and federal regulations for preparation and implementation of erosion control plan.

1.05 PROJECT CONDITIONS

- A. Conform to applicable regulations relating to environmental requirements, disposal of debris, use of herbicides and hazardous materials.
- B. Coordinate clearing work with utility companies.
- C. Protect utilities to remain from damage.
- D. Protect trees, plants, amenities and other features designated to remain as final landscaping.
- E. Protect benchmarks, survey control points and existing structures from damage or displacement.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. See Section 31 23 23 – Fill and Backfill for material specifications.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Locate and identify utilities to remain. Tag utilities to be removed.
- B. Verify that existing plants designated to remain are tagged or identified.

- C. Tag existing plants designated to remain.
- D. Identify a waste area/salvage area for placing removed materials.

3.02 CLEARING

- A. Clear areas required for access to site and execution of work.
- B. Remove trees, shrubs and stumps within limits of construction (LOC).
- C. Remove roots to a depth of 36 inches.
- D. Clear undergrowth and deadwood without disturbing subsoil.
- E. Remove existing sod or vegetation without disturbing topsoil.

3.03 REMOVAL

- A. Remove surface rock.
- B. Remove debris from site.

3.04 SALVAGED MATERIALS

- A. Carefully remove, load, transport, unload, and store materials and items designated as salvage.
- B. Reinstall salvage material and items as shown in the plans.

3.05 DISPOSAL

- A. Remove waste material from project site promptly as it is generated by construction operations; do not permit to accumulate. Unless directed, do not remove topsoil from the site.
- B. Remove brush, trees, stumps, roots, rubbish, spoil, excess excavated material and material not suitable for backfill to off-site location of Contractor's choice, cost to be incidental to the removal.
- C. Disposal areas shall be Contractor's responsibility unless otherwise indicated.
- D. Grade final cover to allow for positive surface drainage.
- E. Haul Routes:
 - 1. Determine haul roads with approval of agency having jurisdiction over proposed roadway.
 - 2. Make condition survey of haul roads prior to use and document with necessary photographs and written descriptions.
 - 3. Keep reasonably free from dirt, dust, mud and other debris from construction operations.
 - 4. Clean a minimum of twice a week.
 - 5. Repair any damaged haul roads to match existing conditions before use.
 - 6. No extra payment shall be made for removals regardless of disposal locations.
 - 7. Temporary haul routes (roads) developed by the Contractor shall be completely removed at the completion of the project and the area returned to its original condition. The cost of temporary haul routes shall be incidental to the cost of the project.

END OF SECTION

**SECTION 31 19 13
BIORETENTION SOIL**

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 this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Soil Medium
2. Compost
3. Hardwood Mulch
4. Fine Sand
5. Rock Filter
6. Filter Fabric
7. Synthetic Fabric Silt Fence

- B. Related Sections included the following:

1. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading
2. Division 31 Section "Erosion and Sedimentation Control" for erosion control materials
3. Division 32 Section "Furnishing and Planting of Plant Material" for plant installation requirements.
4. Division 32 Section "Turf and Grasses" for sod installation requirements.

1.3 SUBMITTALS

- A. Test Results: For each type of product indicated.

1. Compost lab analysis
2. Sand lab analysis
3. Bioretention Soil Medium analysis including hydraulic conductivity (permeability) rates.
4. Field infiltration rate testing before and after planting.

- B. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of bioretention areas during a calendar year. Submit before start of required maintenance periods.

1.4 QUALITY ASSURANCE

- A. Pre-installation Conference: Before installing, conduct conference at project site. Notify Landscape Architect and other participants at least 7 working days before conference.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers. Protect materials from deterioration during delivery and while stored at site.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements including pervious pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge or soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

1.6 PROJECT CONDITIONS

- A. Coordinate bioretention locations, installation, and sequencing with other work to avoid interference and to assure proper placement.

1.7 SPECIAL PROJECT WARRANTY

- A. The contractor shall provide replacement soil for all bioretention areas which may wash away or settle or clog or not function during the first 2 years following the completion and acceptance of bioretention construction. This may include not only the removal and replacement of the impacted material but also the re-sodding or planting of the affected area.
 - 1. Notify Landscape Architect for inspection and acceptance
- B. Completion of the 2-year warranty: Landscape Architect will make an inspection of the bioretention areas for acceptability. The contractor will be notified in writing of any material that shall be replaced as described in paragraph 3.

2. PRODUCTS

2.1 PRODUCTS

- A. Bioretention Soil Medium:
 - 1. Planting mix of Fine Sand and Compost mixed to the following proportion.

<u>Material</u>	<u>%by volume</u>
Compost	50%
Mulch	10%
Fine Sand	40%
 - 2. Planting mix shall be thoroughly mixed
 - 3. Final mix shall have a pH of between 5.5 and 8.0
 - 4. Final mix shall have an organic matter content (tested by ignition) of between 3 and 5%.
 - 5. Final mix shall contain no other material or substances that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations.
 - 6. Final mix shall have a hydraulic conductivity (permeability) rate between 5" per hour and 12" per hour.

7. Provide a two gallon sample of each mix ratio with the required soil test results.

B. Compost:

1. Shall be mature, weed free, and produced by aerobic decomposition of organic matter. Compost feedstock shall be yard waste trimmings and/or source-separated municipal solid waste to produce a fugally dominated compost. The product must not carry any visible refuse or other physical contaminants, substances toxic to plants, or over 5% sand, silt, clay or rock material by dry weight. The product shall possess no objectionable odors. The product must meet all applicable USEPA CRF, Title 40, Part 503 Standards for Class A biosolids. The moisture level shall be such that no visible water or dust is produced when handling the material.
2. Compost shall be dark brown in color, approximately the color of dark chocolate candy (70% chocolate). Black compost and compost the color of milk chocolate shall be rejected.
3. Compost shall have a strong aerobic (sweet) odor. Compost lacking a strong aerobic odor or which has an anaerobic (sour) odor shall be rejected.
4. Testing: The results of Compost analysis shall be provided by the Compost supplier. Before delivery of the Compost, the supplier must provide the following documentation:
 - a. Feedstock percentage in the final Compost product
 - b. A statement that the Compost meets federal and state health and safety regulations.
 - c. A copy of the lab analysis, less than four months old, performed by a Seal of Testing Assurance Certified Laboratory verifying that the Compost meets the following requirements:

1) Physical Requirements for Compost Organic Matter

Parameter	Range	Testing Method
pH	5.5-8.0	TMECC 4.11A
Soluble Salt Concentration	<4dS/m	TMECC 4.10-A
Moisture	35-55% wet weight basis	
Organic Matter	>35% dry weight basis	TMECC 5.07-A
Carbon to nitrogen ratio	15:1-30:1	
Particle Size	99% pass through 2 inch	
TMECC 2.02-B	screen or smaller; 25% pass through 3/8 inch screen or smaller	
Maturity Index	6 to 8 Solvita	
Physical contaminants 3.08-A (man made inerts)	<1% dry weight basis	TMECC

- | | | |
|----|-----------------------|---|
| 2) | Chemical contaminants | Meet or exceed US EPA Class A standard, 40 CFR§ 503.13, Tables 1 and 3 levels |
| | Arsenic AS | <41 ppm TMECC 4.06- |
| | Cadmium CD | < 39 ppm TMECC 4.06- |
| | Copper | <1,500 ppm TMECC 4.05-CU |
| | Lead | <300 ppm TMECC 4.06-PB |
| | Mercury HG | <17 ppm TMECC 4.06- |
| | Molybdenum 4.05-MO | <75 ppm TMECC |
| | Nickel | <420 ppm TMECC 4.06-NI |
| | Selenium | <100 ppm TMECC 4.06-SE |
| | Zinc | <2,800 ppm TMECC 4.06-ZN |
-
- | | | |
|----|-------------------------|---|
| 3) | Biological contaminants | Meet or exceed US EPA Class A standard, 40 CFR§ (pathogens) 503.32(a) levels: |
| | Fecal coliform | <1,000 MPN per gram, TMECC 7.01 by dry weight basis |
| | Salmonella | <3 MPN per 4 grams, TMECC 7.02 dry weight basis |

- d. Compost testing methodologies and sampling procedures shall be as provided in Test Methods for the Examination of Compost and Compost (TMECC), as published by the US Composting Council.
- e. Provide a one gallon sample with manufactures literature and material certification that the product meets the requirements.

C. Hardwood Mulch

- 1. Organic mulch, free from wood chips, sawdust and deleterious materials, suitable for planting beds. Mulch shall consist of six-month-old, well-rotted, shredded native hardwood bark mulch not larger than 3" in length and 1/2" in width.

D. Fine Sand

- 1. Fine concrete sand, ASTM C-33 Fine Aggregate, with a Fines Modulus Index of 2.3 and 3.1
 - a. Sands shall be clean, sharp, natural sands free of limestone, shale and slate particles. Sand pH shall be lower than 8.
 - b. Provide the following particle size distribution:

<u>Sieve:</u>	<u>Percent Passing:</u>
3/8" (9.5mm)	100
No 4 (4.75mm)	95-100
No 8 (2.36mm)	80-100
No 16 (1.18mm)	50-85
No 30 (.60mm)	25-60
No 50 (.30mm)	5-30
No 100 (.15mm)	0-10

- c. Provide a two gallon sample with manufacturer's literature and material certification that the product meets the requirements.

E. Rock Filters

- 1. Rock Filter 1: double washed, free draining #8 aggregate
- 2. Rock Filter 2: double washed, free draining #57 aggregate

F. Filter Fabric: meets the following requirements:

- 1. ASTM D-4632 (tensile strength – 205 lb)
- 2. ASTM D-6241 (puncture strength – 500 lb)
- 3. ASTM D-3786 (Mullen burst strength – 350 PSI)
- 4. Woven
- 5. Maintains 75 GPM per s.f. flow rate

G. Geotextiles

- 1. Synthetic filter fabric used for silt fences shall conform to the following specifications:

<u>Fabric Properties</u>	<u>Minimum Requirements</u>	<u>Test Method</u>
Filtering Efficiency	70%	ASTM 5141
Standard Strength	30 lb./linear inch	ASTM 4632
High Strength	50 lb./linear inch	ASTM 4632
Flow Rate	.2 gal./SF/minute	ASTM 5141
Ultraviolet Radiation	90%	ASTM G 26

- 2. The following products or their approved equivalents are considered to be acceptable for use as silt fence:

<u>Product</u>	<u>Manufacturer</u>
Mirafi 100X	Mirafi Inc.
Propex Silt Stop 901	Amoco
Terratex SC	Webtech Inc

H. POSTS AND STAKES

- 1. Fence posts for silt fence shall be constructed of weathered oak or steel and of size and profile as noted on the drawings.
 - a. Post Spacing: Maximum of six (6) feet apart if not supported by wire mesh and a maximum of ten (10) feet apart for filter fabric supported by wire mesh.
- 2. Silt Fence shall be constructed as noted on the drawings.
- 3. Stakes used for curb inlet filter hold downs shall be constructed as noted on the drawings.

3. EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for earthwork, pavement work, erosion control, and other conditions affecting performance of work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Landscape Architect
- B. Proceed with installation only after unsatisfactory conditions have been removed.

3.2 PREPARATION

- A. Outline and stake location of bioretention area for Landscape Architect approval.

3.3 INSTALLATION

- A. Install bioretention locations indicated and noted on the drawings
- B. Rip bottom and sides of the Bioretention cells to a minimum depth of 18" prior to installation of soils, 36" O.C., perpendicular to the drain pipe alignment. Remove soil that has been pulled up by ripping process and fill opening left by the ripping process with sand. The soil shall not be blended.
- C. Installation of soils must be done in a manner that will ensure adequate Infiltration
- D. Installed in 8" lifts with minimal compaction effort, lifts are not compacted but performed to prevent possibility of excessive settlement
- E. No additional manual compaction of soil is necessary. Rake soil material as needed to level out. Overfill above the proposed surface invert to accommodate natural settlement to proper grade. Depending upon the soil material, up to 20% natural compaction may occur
- F. Sieve analysis, pH, porosity, permeability and organic matter tests must be performed per each bioretention area.
- G. It is very important to minimize compaction of both the base of the bioretention area and the required backfill. When possible, use excavation hoes to remove original soil. If bioretention areas are excavated using a loader, equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high-pressure tires will cause excessive compaction resulting in reducing infiltration rates and storage volumes and is not acceptable. Compaction will significantly contribute to design failure. Compaction can be alleviated at the base of the bio retention facility by using a primary tilling operation such as a Chisel Plow, Ripper, or Subsoiler. These tilling operations are to refracture the soil profile through the 12-inch compaction zone. Substitute methods must be approved by the Landscape Architect. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

- H. When back filling the bioretention facility, do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact LGP loader or a dozer/ loader with marsh tracks.
- I. Install silt fence between the bioretention soil and the adjacent topsoil to prevent sedimentation until the turf grass or planting bed has been fully established.
- J. In order to speed up the natural compaction process, presoaking the placed soil may be performed. Significant settlement can occur after the first presoak, and additional settlement may occur subsequent to the initial wetting. If time and construction scheduling permits, it is preferable to allow natural settlement to occur with the help of rain events to presoak the soil medium.
- K. Perform first field infiltration test using the Double-Ring Infiltrometer Test method. The test shall be performed in each bioretention filtration area. Rate shall be between 5" and 12" per hour.
 - 1. The infiltration tests should not be conducted in the rain, within 24 hours of a significant rainfall event (> 0.5"), when the temperature is below freezing or when there is frost in the ground.
 - 2. Equipment for double-ring infiltrometer test:
 - a. Two concentric cylinder rings (pipes) 8 inches or greater in height. The inner ring diameter shall be equal to 50-70 percent of the outer ring diameter (i.e., an 8-inch dia. ring and a 12-inch dia. ring).
 - b. Clean water supply
 - c. Stopwatch or timer
 - d. Ruler or metal measuring tape
 - e. Flat wooden board for driving cylinders uniformly into soil
 - f. Rubber mallet
 - g. Log sheet for recording data
 - 3. Procedure for double-ring infiltrometer test:
 - a. Prepare level testing area.
 - b. Install outer ring in place; place flat board on ring and drive ring into soil to a minimum depth of four inches.
 - c. Place inner ring in center of outer ring; place flat board on ring and drive ring into soil a minimum of four inches. The bottom rim of both rings should be at the same level.
 - d. The test area should be presoaked immediately prior to testing. Fill both rings with water to water level indicator mark or rim at 30 minute intervals for one hour. The minimum water depth should be four inches. The drop in the water level during the last 30 minutes of the presoaking period should be applied to the following standards to determine the time interval between readings:
 - 1) If water level drop is two inches or more, use 10 minute measurement intervals.
 - 2) If water level drop is less than two inches, use 30 minutes measurement intervals.

- e. Obtain a reading of the drop in water level in the center ring at appropriate time intervals. After each reading, refill both rings to water level indicator mark or rim. Measurement to the water level in the center ring should be made from a fixed reference point and should continue at the interval determined until a minimum of eight readings are completed or until a stabilized rate of drop is obtained, whichever occurs first. A stabilized rate of drop means a difference of ¼-inch or less of drop between the highest and the lowest reading of four consecutive readings.
 - f. The drop that occurs in the center ring during the final period or the average stabilized rate, expressed as inches per hour, represents the infiltration rate for that test location.
- L. Install plant material, carefully ensuring that the soil medium is not compacted.
 - M. Perform second field infiltration test using the Double-Ring Infiltrometer Test method described above. The test shall be performed in three areas evenly spaced across the bioretention filtration area. Rate shall be between 2" and 5" per hour.

3.4 MAINTENANCE

- A. Begin maintenance immediately after installation.
- B. Protect Bioretention Soil from sedimentation from adjacent soils and pavements with silt fence and other means. Check for signs of erosion or sedimentation after rainstorms. Repair gullies or other signs of erosion and remove sedimentation or soil that has been clogged. Additional soil medium may be necessary.
- C. Replace any dead plant material immediately to ensure healthy growth.
- D. Remove accumulated sediment; replace top inch of soil when clogged.

3.5 CLEANUP AND PROTECTION

- A. During bioretention work, keep pavements clean and work areas in an orderly condition.

END OF SECTION

SECTION 31 22 00
GRADING, EXCAVATION AND EMBANKMENT

1. GENERAL

1.01 SECTION INCLUDES

- A. Removal, storage, and placement of topsoil.
- B. Rough grading for site improvements.
- C. Building, Shaping, Excavation and/or Embankment for:
 - 1. Building volume below grade, footings, pile caps, site structures, box culverts, and general grading and fills.
 - 2. Roadbeds, subgrades, shoulders, bridge approaches and private entrances.
 - 3. Slopes, dikes, channels and ditches needed for drainage.
 - 4. Stripping of all unsuitable materials.
 - 5. Obtaining soils from off-site borrow pit.

1.02 REFERENCES

- A. State Standard Specifications, latest edition.
- B. AASHTO T 180 – Standard Specification for Moisture – Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 inch) Drop: American Association of State Highway and Transportation Officials.
- B. ASTM C 136 –Standard Test Method for Sieve Analysis of Fine Coarse Aggregates.
- C. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
- D. ASTM D 1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- E. ASTM D 1557 –Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³)).
- F. ASTM D 2167 –Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D 2487 –Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- H. ASTM D 6938 –Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- J. ASTM D 4318 –Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.05 SUBMITTALS

- A. Project Record Documents: Contractor shall accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.
- B. Samples: 60-pound samples of each type of fill. Submit in airtight containers to testing laboratory unless samples are to be acquired by the testing agency.

- C. Materials Sources: Submit name of imported materials source.
- D. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- E. Compaction density test reports.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with State Standard Specifications

1.07 PROJECT CONDITIONS

- A. Protect above and below-grade utilities that remain.
- B. Protect plants, lawns, rock outcroppings, amenities and other features to remain as a portion of final landscaping.
- C. Protect benchmarks, survey control points, existing structure, fences, sidewalks, paving, curbs, batter boards and amenities from excavating equipment and vehicular traffic.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. See Section 31 23 23 – Fill and Backfill for material specifications.
- B. Water required for grading is Contractor's responsibility. The cost of furnishing water will not be a direct pay item, unless specified otherwise, but is to be included in other items for which payment is made.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that survey benchmark and intended elevations for the work are as indicated.

3.02 PREPARATION

- A. Identify required lines, levels, contours and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify and protect utilities that remain from damage.
- D. Notify utility owner to remove and relocate utilities when relocation is required.
- E. Implement erosion control plan.

3.03 EXCAVATING

- A. Underpin adjacent structures which may be damaged by excavating work.
- B. Excavate to accommodate new structures.
- C. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- D. Slope bank of excavations deeper than 3 feet to angle of repose or less until shored.
- E. Do not interfere with 45 degree bearing splay of foundations.
- F. Cut utility trenches wide enough to allow inspection of installed utilities.
- G. Hand trim excavations. Remove loose materials.
- H. Remove lumped subsoil, boulders and rock.
- I. Correct areas that are over-excavated and load-bearing surfaces that are disturbed.

- J. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- K. Remove excavated material that is unsuitable for reuse from site.
- L. Remove excess excavated material from site.

3.04 ROUGH GRADING

- A. Remove topsoil within the limits of construction (LOC) without mixing with foreign materials and stockpile. Minimum depth of topsoil removal shall be 6 inches unless otherwise noted in the drawings.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, relandscaped or regraded.
- D. Do not remove wet subsoil unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. Benching Slopes: Horizontally bench existing slopes greater than 1 foot vertical rise in 4 feet to key fill material to slope for firm bearing.
- G. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- H. Employ a compaction method that achieves the specified density requirements.
- I. Employ a placement method that does not disturb or damage other work.
- J. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- K. Maintain optimum moisture content of fill materials to attain required compaction density.
- L. Granular Fill: Place and compact materials in equal, continuous layers not exceeding 6 inches compacted depth.
- M. Maintain Roadbed in Such Condition That:
 - 1. Roadbed drains at all times.
 - 2. Side ditches are constructed to avoid damage to embankments by erosion.
 - 3. Slopes are trimmed accurately.
 - 4. Avoid loosening material below or outside of the required slopes, remove all breakage and slides.
 - 5. Excavate side ditches as shown in the drawings.
 - 6. Finished roadway matches the lines, grades and cross sections shown in the drawings.

3.05 SOIL REMOVAL AND STOCKPILING

- A. Stockpile topsoil to be reused on site. Remainder to be removed from site and disposed of at a location of the contractor's choice.
- B. Stockpile subsoil to be reused on site. Remainder to be removed from site and disposed of at a location of the contractor's choice.
- C. Stockpiles: Use areas designated; protect from erosion.

3.06 FINISH GRADING

- A. Before Finish Grading:

1. Verify building and trench backfilling have been inspected.
2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches and stones in excess of 1 inch in size.
- C. Where topsoil is to be placed, scarify subgrade to depth of 6 inches.
- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 8 inches.
- E. Place topsoil in areas where seeding, sodding and planting are indicated.
 1. Provide ½" edge against sidewalks to allow sod to site flush with pavement edge.
- F. Place topsoil to the following compacted thicknesses:
 1. Areas to be Seeded with Grass: 6 inches.
 2. Areas to be Sodded: 4 inches.
 3. Shrub Beds: 12 inches.
- G. Place topsoil during dry weather.
- H. Remove roots, weeds, rocks and foreign material while spreading.
- I. Near trees, shrubs and buildings, spread topsoil manually to prevent damage.
- J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

3.07 HAUL ROUTES

- A. Determine haul roads with approval of agency having jurisdiction over proposed roadway.
- B. Make condition survey of haul roads prior to use and document with necessary photographs and written descriptions.
- C. Keep reasonably free from dirt, dust, mud and other debris from construction operations.
- D. Clean a minimum of twice a week.
- E. Repair any damaged haul roads to match existing conditions before use.
- F. No extra payment shall be made for removals regardless of disposal locations.
- G. Temporary haul routes (roads) developed by the Contractor shall be completely removed at the completion of the project and the area returned to its original condition. The cost of temporary haul routes shall be incidental to the cost of the project.

3.08 TOLERANCES

- A. Top Surface of Finish Grade and/or Subgrade: Plus or minus 0.08 feet from required elevation.

3.09 FIELD QUALITY CONTROL

- A. Compaction density testing shall be performed on compacted fill in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938.
- B. Results shall be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 "standard proctor", ASTM D 1557 "modified proctor" or AASHTO T 180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

- D. Frequency of Tests:
 - 1. Test randomly.
 - 2. Under Paving, Slabs-on-Grade and Similar Construction, or as directed by Engineer: A minimum of 1 test for each lift of 0 to 2 feet in depth per 100' x 100' area or as determined by Engineer.
- E. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers and paving.

3.10 CLEANING AND PROTECTION

- A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- C. Remove unused stockpiled topsoil and subsoil. After removing all stockpiles, grade areas to prevent standing water. Maintain drainage away from buildings and structures at a 2 percent grade or as indicated on the drawings.
- D. Leave site clean and raked, ready to seed, sod or landscape.

END OF SECTION

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SECTION 31 23 13
SUBGRADE PREPARATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Subgrade preparation of subgrade soils.

1.03 REFERENCES

- A. State Standard Specifications, latest edition.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. See Section 31 23 23 – Fill and Backfill for material specifications.
- B. Water required for subgrade preparation is Contractor's responsibility. The cost of furnishing water will not be a direct pay item but is to be included in the bid item subgrade preparation.

2.02 CERTIFICATION

- A. Borrow material delivered to the project must be approved by Owner's designated geotechnical firm prior to bringing the material on-site. Contractor shall be responsible for any testing costs to confirm that the material is acceptable.

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

- A. Subgrade preparation shall include the subgrade directly under the proposed pavement and shall extend a minimum of 5 feet, or width stated on Plans, laterally beyond the edge of the pavement. The depth of the subgrade preparation shall be a minimum of 24".
- B. The subgrade shall be disced or ripped, removed or windrowed to thoroughly mix the soil, then redistributed and compacted in 8-inches or less lifts
- C. The subgrade should be compacted to a minimum of 96 percent of the maximum dry density as determined by ASTM D698, Standard Proctor Moisture Density Relationship. Moisture content at the time of the compaction for all structural fill should be controlled between +/-3 percent of the optimum moisture content.
- D. Subgrade testing shall be completed by an approved testing laboratory and shall be at Contractor's expense. Any areas that do not meet the compaction requirements shall be reworked and recompacted at Contractor's expense. Any retesting of the subgrade shall be at Contractor's expense.
- E. Subgrades shall be profiled with an automated, electronically controlled machine. The machine must provide accurate vertical and horizontal control.
- F. The subgrade surface shall be proof rolled to identify any soft spots prior to the placement of any paving. The removal and replacement of the material in any soft spots to a minimum depth of 12 inches shall be at Contractor's expense.
- G. Subgrade profiling and other subgrade preparations are subsidiary to subgrade preparation.

- H. The material from subgrade profiling shall be removed from the site at the time of profiling operations if it is not suitable for use as final grading material. If this material is not to be used as backfill material, it shall be disposed of at Contractor's own disposal site. Engineer to determine the suitability of the trimmings for use as final grading material.

3.02 FIELD QUALITY CONTROL

- A. Compaction density testing shall be performed on compacted fill in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938.
- B. Results shall be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 "standard proctor", ASTM D 1557 "modified proctor" or AASHTO T 180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests:
 - 1. 1 test per 100 to 150 linear feet per lane of roadway subgrade or as determined by Engineer.
 - 2. 1 test per 100' X 100' area or as directed by Engineer for irregular areas.
- E. Proof roll subgrade that will be under paving.

END OF SECTION

SECTION 31 23 23
FILL AND BACKFILL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling and compacting for building volume below grade, footings, slabs-on-grade, paving, site structures and utilities all within the building envelope, and pile caps.
- B. Filling holes, pits and excavations generated as a result of removal operation.
- C. Backfilling around and outside of structures.

1.02 REFERENCES

- A. AASHTO T 180 – Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop; American Association of State Highway and Transportation Officials.
- B. ASTM C 136 – Standard Test Method for Sieve Analysis of Fine Coarse Aggregates.
- C. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).
- D. ASTM D 1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- E. ASTM D 1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
- F. ASTM D 2167 – Standard Test Method for Density and Unit Weight of Soil in Place by Rubber Balloon Method.
- G. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- H. ASTM D 6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- I. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- J. State Standard Specifications for Highway Construction, latest edition, including all current supplemental specifications.

1.04 SUBMITTALS

- A. Samples: 60-pound sample of each type of fill. Submit airtight containers to testing laboratory.
- B. Materials Sources: Submit name of imported materials source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction density test reports.

1.05 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on-site in advance of need.
- B. When fill materials need to be stored on-site, locate stockpiles where designated.

1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 2. Prevent contamination.
 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey benchmarks and intended elevations for work are as indicated.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. Fill Materials: fill materials shall meet the criteria stated in this section.
- B. Non-structural Fill: Subsoil excavated on-site.
1. Material should not contain an appreciable amount of roots, rock, or debris, and should not contain any foreign material with a dimension greater than 3 inches.
 2. ASTM C 2487 classification: GW, GP, GM, GC, SC, SW, SP, SM, ML, CL-ML or CL.
 3. Liquid limit: Less than 45.
 4. Maximum plasticity index: 20.
- C. Structural Fill: Subsoil excavated on-site.
1. Low volume change cohesive soils, free of organic matter, rocks or foreign material.
 2. ASTM D 2487 classification: CL, ML, or CL-ML.
 3. Liquid limit: Less than 45.
 4. Maximum plasticity index: 20.
- D. Flowable Fill:
1. A mixture of cement, fly ash, fine sand, water and air having a consistency which will flow under a very low head.
 2. Approximate quantities, per cubic yard:
 - a. Cement (Type II): 50 Lbs.
 - b. Fly ash: 200 Lbs.
 - c. Fine Sand: 2,700 Lbs.
 - d. Water: 420 Lbs.
 - e. Air Content: 10 percent
 3. Compressive Strength: 85 to 175 psi.
- E. Topsoil: Topsoil excavated on-site.
1. Unclassified.
 2. Free of roots, rocks, subsoil, debris, large weeds and foreign matter.
- I. Water: Water required for fill and backfill is Contractor's responsibility. The cost of furnishing water will not be a direct pay item but is to be included in other items for which payment is made, unless stated otherwise.

2.02 SOURCE QUALITY CONTROL

- A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the work.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours and datum locations.
- B. Verify subdrainage, dampproofing or waterproofing installation has been inspected.
- C. Verify structural ability of unsupported walls to support imposed loads by the fill.

3.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with specified fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING AND BACKFILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Fill and Backfill: Place and compact materials in equal, continuous layers not exceeding 6 inches compacted depth.
- F. Slope grade away from building minimum 2 percent or as shown on the plans. Make gradual grade changes. Blend slope into level areas.
- G. Correct areas that are over-excavated.
 - 1. Load-Bearing Foundation Surfaces: Use structural fill, flush to required elevation.
 - 2. Other Areas: Use non-structural fill, flush to required elevation
- H. Compaction density(s) shall be to a minimum of 96 percent of the maximum dry density as determined by ASTM D698.
- I. Reshape and recompact areas subjected to vehicular traffic.

3.04 TOLERANCES

- A. Top Surface of Fill: Plus or minus 0.08 foot from required elevations.

3.05 FIELD QUALITY CONTROL

- A. Compaction density testing shall be performed on compacted fill in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938.

- B. Results shall be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 "standard proctor", ASTM D 1557 "modified proctor" or AASHTO T 180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests:
 - 1. Test randomly.
 - 2. Under Paving, Slabs-on-Grade and Similar Construction: A minimum of 1 test for each lift of 0 to 2 feet in depth per 100' x 100' area or as determined by Engineer.
- E. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers and paving.

3.06 CLEANUP

- A. Remove unused stockpiled materials; leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- B. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 31 23 33
TRENCHING FOR UTILITIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Excavation, backfilling and compacting for utilities.

1.02 REFERENCES

- A. AASHTO T 180 - Standard Specification for Moisture - Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials.
- B. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine Coarse Aggregates.
- C. ASTM D 698 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- D. ASTM D 1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
- E. ASTM D 1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- F. ASTM D 2167 – Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
- G. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- H. ASTM D 6938 – Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- I. ASTM D 4318 – Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- J. State Standard Specifications for Highway Construction, latest edition, including all current supplemental specifications.

1.04 SUBMITTALS

- A. Samples: 1 quart sample of each type of fill. Submit in airtight containers to testing laboratory.
- B. Materials Sources: Submit name of imported materials source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- D. Compaction density test reports.

1.05 PROJECT CONDITIONS

- A. Provide sufficient quantities of fill to meet project schedule and requirements. When necessary, store materials on-site in advance of need.
- B. When fill materials need to be stored on-site, locate stockpiles where designated. See Engineer.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.

2. Prevent contamination.
 3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey benchmarks and intended elevations for the work are as indicated. Notify Engineer immediately if a discrepancy is identified.
 - D. Protect plants, lawns, rock outcroppings, trees, amenities and other features to remain.
 - E. Protect benchmarks, survey control points, existing structures, fences, sidewalks, paving, curbs, utility pedestals and amenities from excavating equipment and vehicular traffic.
 - F. Provide exploratory excavation to determine exact location of existing underground structures or utilities.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. See Section 31 23 23 – Fill and Backfill for material specifications.

2.02 SOURCE QUALITY CONTROL

- A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.
- B. If tests indicate materials do not meet specified requirements, change material and retest.
- C. Provide materials of each type from same source throughout the work.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours and datum locations.

3.02 TRENCHING

- A. Notify Engineer of unexpected subsurface conditions and discontinue affected work in areas until notified to resume work.
- B. Slope banks of excavation deeper than 3 feet to angle of repose or less until shored.
 1. Install shoring to protect pavements and structures or where backsloping is impractical.
 2. Pile excavated material beyond edge of trench to prevent slides and cave-in.
- C. Stockpile topsoil material for placement in areas disturbed by construction.
- D. Do not interfere with 45 degree bearing splay of foundations.
- E. Cut trenches wide enough to allow inspection of installed utilities.
- F. Bottom width of trench not less than 8 inches nor more than 12 inches on each side of pipe, or as indicated on the Plans.
- G. Hand trim excavations. Remove loose material.
- H. Remove large stones and other hard matter which could damage piping or impede consistent backfilling or compaction.
- I. Remove lumped subsoil, boulders and rock.
- J. Remove excavated material that is unsuitable for reuse from site.
- K. Stockpile excavated material to be reused in area designated on-site.
- L. Remove excess excavated material from site.

3.03 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with specified fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material. See Geotechnical Report.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.
- D. Provide uniform bearing for each pipe section.
 - 1. Round bottom of trench to allow at least 1/4 of the circumference to rest firmly on undisturbed earth.
 - 2. Excavate holes for pipe bells.
- E. Verify that trace wire has been installed and is unbroken or damaged.

3.04 BEDDING AND BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Adjust and maintain optimum moisture content of fill and backfill materials to attain required compaction density.
- E. Fill: Place and compact materials in equal, continuous layers.
- F. Place bedding material as indicated on the drawings.
- G. Manually backfill under pipe haunches and around bells.
 - 1. Fill in uniform layer on each side of pipe to prevent displacement.
 - 2. Use handheld pneumatic or mechanical compacting equipment.
 - 3. Use manual methods until backfill is a minimum of 12 inches above top of pipe, or as indicated on the Plans.
 - 4. Use caution to prevent damage to trace wire.
- H. Leave shoring in place where required to protect structures or pavement.
 - 1. Cut off top of piling a minimum of 36 inches below subgrade elevation.
- I. Correct areas that are over-excavated.
 - 1. Thrust Bearing Surfaces: Fill with concrete.
 - 2. Other Areas: Use specified fill, flush to required elevation, compacted as per the geotechnical report.
- J. Reshape and recompact areas subjected to vehicular traffic.
- K. Slope grade away from building and structures minimum 2 percent unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

3.05 TOLERANCES

- A. Top Surface of Backfill: Plus or minus 0.08 feet from required elevations.

3.06 FIELD QUALITY CONTROL

- A. Compaction density testing shall be performed on compacted fill in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 6938.
- B. Results shall be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 698 "standard proctor", ASTM D 1557 "modified proctor" or AASHTO T 180.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests:
 - 1. Under Paving, Slabs-on-Grade and Similar Construction:
 - a. 1 test per 150 linear feet of main line or as determined by Engineer. Test at random depths.
 - b. 1 test of each service line or as determined by Engineer.
 - 2. Nonpaved Area:
 - a. 1 test per 300 linear feet of main line or as determined by Engineer. Test at random depths.
 - b. 1 test of each service line or as determined by Engineer.
- E. Proof roll compacted fill at surfaces that will be under slabs-on-grade, pavers and paving.

3.07 CLEANUP

- A. Remove unused stockpiled materials; leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 31 25 00
EROSION CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Storm water pollution prevention plans – SWPPP.
- B. Permits.
- C. Erosion control blanket.
- D. Silt fence.
- E. Straw wattle.
- F. Inlet filters.

1.03 REFERENCES

- A. Erosion Control Technology Council.
- B. National Pollutant Discharge Elimination System (NPDES) General NPDES Permit Number NER110000.
- C. State Standard Specifications, latest revision.

1.04 PERMITS

- A. NPDES: The Owner is responsible for submitting the Notice of Intent (NOI) to the permitting authority for this project. Once the project is provided a permit number and the proper forms are received, copies will be provided to the Contractor.
 - 1. Under this permit the Contractor will be responsible for:
 - a. Filling out and obtaining signatures on the Start Form. This must be turned in prior to work beginning on the project.
 - b. Installation and removal as called for on plans and in these specifications.
 - c. Maintain the site according to the permit requirements. Erosion control features will be cleaned when they have been 50 percent filled.
 - d. Completing a daily record for erosion control measures installed and condition of those installed previously.
 - e. Maintaining a record of rainfall events and the effects on the erosion control measures.
 - f. Maintain a record of events when the erosion control measures failed and what corrective measures were taken.
 - g. Filling out and obtaining signatures on the End form. This must be turned in at the completion of work on the project.
 - h. Allowing for the inspection of the site by others including; Regulatory Authority, Engineer, Owner or other designated representatives.
 - i. Providing a copy of all documents to Engineer and Owner at completion of project.

PART 2 - PRODUCTS

2.01 EROSION CONTROL BLANKET

- A. The erosion control blanket shall be placed as per the manufacturer's recommendations and the plans. The erosion control blanket shall be placed after the area is seeded and before the area is mulched.
- B. Wire staples shall be used for anchoring the erosion control blanket. The staple pattern shall be per the manufacturers recommendations.
- C. The seed shall comply with the applicable portions of Section 01 10 00 – Special Provisions and Section 32 92 19 - Seeding. The seed mixture shall be of the types and applied at the rate shown in the special provisions.
- D. The fertilizer shall comply with the applicable portion of Section 32 92 19 - Seeding. The fertilizer shall be of the types and applied at the rate shown in the special provisions.
- E. All erosion control mats shall be of type specified in the plans.

2.02 SILT FENCE

- A. The silt fence material shall be of the type specified in the plans.
- B. The stakes shall be as shown in the plans, or as follows:
 - 1. The pins that are required shall be 11 gauge (0.120 inch) steel wire with a 1 inch or larger throat with at least 6-inch legs.
 - 2. Silt fence stakes shall be 5.5 foot studded, steel "T" fence posts.
 - a. Used posts are acceptable.
- C. Stakes for low profile silt fence shall be wood, 1 1/2 inches x 1 1/2 inches x 36 inches.

2.03 STRAW WATTLE

- A. The straw wattles (or sediment logs) shall be of the type, size and length specified in the plans.
- B. The stakes shall be as shown in the plans.
 - 1. Wood stakes shall be 1-1/8" x 1-1/8" x 30" for 9" and 12" straw wattle.
 - 2. Wood stakes shall be 1-1/8" x 1-1/8" x 48" for 20" straw wattle.

2.04 INLET FILTERS

- A. The inlet filters shall be of the type and size as shown on the plans.

PART 3 - EXECUTION

3.01 SWPPP OR STORM WATER MANAGEMENT PLAN

- A. These facilities shall be constructed as shown on the plans. The SWPPP shall be maintained throughout the duration of the project and until the Engineer has deemed the SWPPP may be closed, transferred to another party.

3.02 EROSION CONTROL BLANKETS

- A. This work shall be performed as soon as possible after finish grading operations have been completed or as directed.
- B. No restrictive seeding time periods shall apply to this work.

- C. Contractor shall tamp and shape fill earth to the finish grade as needed to repair erosion to the grades and conditions shown in the plans.
 - 1. If additional fill dirt is required, it will not be paid for as extra work and must be provided and placed at no additional cost.
- D. Contractor shall perform all work in the areas to be protected so that the land surface is graded smooth and free of all debris, including roots and stones larger than 1 inch in their largest dimensions.
 - 1. All lumps of soil shall be pulverized, raked out or removed.
 - 2. Vegetation shall be removed from these areas, except for the desirable native vegetation that has been designated by Engineer to remain undisturbed.
 - 3. The soil in the areas to be protected by the soil retention blanket shall be loosened to a depth of not less than 1 inch by discing, harrowing, raking or other approved methods.
- E. Contractor shall obtain Engineer's approval of all soil preparation work, fertilizer and seed.
- F. Contractor shall place the erosion control blankets immediately following fertilizing and seeding.
 - 1. The blanket shall be laid out flat, parallel to the surface runoff flow direction, and secured as shown in the plans for each specific type of erosion control.
 - 2. Care shall be exercised in placing the blanket so as not to disturb previously seeded areas.

3.03 SILT FENCE

- A. The silt fence shall be installed and in good working condition prior to any grading operations taking place.
 - 1. Contractor shall excavate a trench to the depth, width and length shown in the plans.
- B. Contractor shall place the silt fence in the trench and pin it as shown in the plans.
 - 1. If the silt fence is installed with mechanical methods, installing pins is not required.
- C. Contractor shall backfill the trench, compact the soil and attach the fabric to the posts as shown in the plans.
 - 1. All silt fence splice joints shall be overlapped a minimum of 16 inches (400 mm).
- D. Contractor shall remove and dispose of silt that accumulates near the silt fence during construction and at completion of the project. Each time silt is removed, the fence shall be repaired to a good working condition.
- E. Contractor shall maintain the silt fence in good working condition at all times.

3.04 STRAW WATTLES

- A. Contractor shall place straw wattles immediately after finish grading is complete in areas where straw wattles are to be constructed or as directed.
- B. Contractor shall install straw wattles as per the plans.
- C. The remainder of the area shall be prepared and the entire area shall be fertilized and

seeded in accordance with Standard Specifications or Section 32 92 19 – Seeding.

- D. Contractor shall then place the erosion control blanket and staple it as shown in the plans.
 - 1. If the filter fabric is attached to the erosion control blanket, then the seed shall be broadcast over the blanket and then the blanket shall be soil filled.
- E. The limits of the completed straw wattles shall extend up the fore slope and back slope of the swale or channel to effectively contain the runoff and prevent erosion and washout at the edges of the installation.
- F. All straw wattles shall be held securely in place.
- G. In shale, the 2 reinforcing steel stakes in each barrier shall be wired together to prevent the barrier from floating off the stakes.
- H. All stakes shall be driven into the ground a minimum of 16 inches.
- I. Contractor shall remove and dispose of silt that accumulates adjacent to the straw wattle.

3.05 INLET FILTERS

- A. Contractor shall install inlet filters immediately after the construction of the inlet structure.
- B. Contractor shall remove and dispose of silt that accumulates in the inlet filter. If the inlet filter becomes damaged, the Contractor shall replace the inlet filter, the cost of such shall be incidental.

3.06 EROSION CONTROL REMOVAL

- A. Contractor shall remove inlet filters, silt fence, straw wattles including stakes and posts, after vegetation has been fully established and as otherwise directed by Engineer (not to exceed 1 year).
- B. Contractor to obtain permission from Engineer prior to the removal of any erosion control materials.

3.07 SWPPP FACILITY REMOVAL

- A. Contractor is required to remove facilities that were constructed as part of a SWPPP, such as detention or sedimentation basins, accumulated silt, drainage piping, riprap, etc.
- B. Contractor to obtain permission from the Engineer prior to the removal of any SWPPP Facilities.

END OF SECTION

SECTION 32 13 13
PORTLAND CEMENT CONCRETE PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Concrete roads, streets, sidewalks, trails, curb ramps, curb and gutter, driveways, alleys and parking areas.

1.02 REFERENCES

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
- B. ACI 301 - Specifications for Structural Concrete for Buildings
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete
- D. ACI 305R – Guide for Hot Weather Concreting
- E. ACI 306R – Guide to Cold Weather Concreting
- F. ASTM A 185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete (Withdrawn 2013).
- G. ASTM A 497 – Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete (Withdrawn 2013).
- H. ASTM A 615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- I. ASTM C 33 – Standard Specification for Concrete Aggregates.
- J. ASTM C 39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C 94 – Standard Specification for Ready-Mixed Concrete.
- L. ASTM C 150 – Standard Specification for Portland Cement.
- M. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- N. ASTM C 260 – Standard Specification for Air-Entraining Admixtures for Concrete.
- O. ASTM C 309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- P. ASTM C 311 – Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete.
- Q. ASTM C 494 – Standard Specification for Chemical Admixtures for Concrete.
- R. ASTM C 618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- S. ASTM C 685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
- T. ASTM C 1074 – Standard Practice for Estimating Concrete Strength by the Maturity Method.

- U. ASTM C 1116 – Standard Specification for Fiber-Reinforced Concrete.
- V. ASTM D 1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- W. ASTM D 1752 – Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete paving and Structural Construction.
- X. ASTM D 3405 – Standard Specification for Joint Sealants, Hot-Applied for Concrete and Asphalt Pavements (Withdrawn 2002).
- Y. AASHTO M 33 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- Z. AASHTO M 148 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- AA. State Standard Specifications for Highway Construction, Latest Addition, including all current supplemental specifications.

1.03 SUBMITTALS

- A. Submit the proposed mix design for each class of concrete to Engineer and testing firm for review prior to commencement of concrete operations.
- B. Submit information on any proposed additives for the mix design.
- C. Submit information on reinforcement for baskets, special design, etc.
 - 1. Included material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement and supports of concrete reinforcement.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.

1.04 QUALITY ASSURANCE

- A. Obtain cementitious materials, aggregate and each admixture from same source throughout.
- B. Concrete Supplier Qualifications: Firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
 - 1. Concrete Supplier must be certified according to the National Ready Mixed Concrete Association Certification of Ready Mixed Concrete Production Facilities.
- C. Testing Agency Qualifications: Independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct testing indicated, as documented according to ASTM E 548.
- D. Follow recommendations of the applicable State or Local Standard Specifications, and ACI 306R, when placing concrete during hot or cold weather.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Reference: Applicable State or Local Standard Specifications.

- B. Do not place concrete when base surface temperature is less than 40 degrees F or surface is unstable or frozen.
- C. Do not start to place concrete until ascending ambient air temperature reads 41 degrees F.
- D. Cease placing operations when descending ambient air temperature reaches 41 degrees F.
- E. Protect concrete when the air temperature may be expected to drop below 36 degrees F.
- F. Any concrete damaged by freezing will be rejected. Removal and replacement at Contractor's expense.
- G. When evaporation rate approaches 0.2 lb/sf/h, Contractor must notify Engineer regarding the actions to be taken to prevent plastic shrinkage cracking. Obtain rate of evaporation using nomograph, applicable State or Local Standard Specifications.

1.06 METHOD OF CONSTRUCTION

- A. Full Width, Slip Form Paving Machines:
 - 1. Required method of main line paving.
 - 2. Reference: Applicable State or Local Standard Specifications.
 - 3. Exceptions to Full Width Paving:
 - a. Intersection returns.
 - b. Driveways and parking area.
 - c. Irregular shapes.
 - d. Sidewalks.
 - e. Areas designated in the drawings to be constructed in phases in order to provide access to property.
- B. Paving Less Than Full Width:
 - 1. Restrictions:
 - a. No equipment is allowed within 3 feet of the edge of freshly poured concrete paving for a minimum of 3 days.
 - b. No concrete trucks, pumping machines, paving machines, conveyors or related equipment used to transport or place concrete shall be allowed on new paving for a minimum of 7 days and concrete has developed a compressive strength of 3,500 psi.
 - 2. Additional Costs:
 - a. If approved by Owner and Engineer, Contractor shall be responsible for additional costs related to paving less than full width on main line paving areas.
 - b. If approved by Owner and Engineer, Contractor shall make payment to Owner an amount equal to 5.0 percent of the total bid for square yards of concrete paving as submitted to compensate for the additional time involved. This payment shall be made to Owner prior to final payment of the completed project.

- c. Additional costs include:
 - (i) Construction staking.
 - (ii) Construction observation by resident project representative (RPR) and/or Engineer.
 - (iii) Construction Administration.
 - (iv) Additional compaction testing of subgrade.
 - (v) Additional concrete testing.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: Conform to applicable State or Local Standard Specifications.

2.02 REINFORCEMENTS

- A. Tie Bars: New, deformed billet-steel bars, Grade 60, ASTM A 615.
- B. Dowel Bars: New, smooth, round steel bars, Grade 60, ASTM A 615 coated with organic coating AASHTO M 254, corrosion resistant coated dowel bars.

2.03 CONCRETE MATERIALS

- A. Concrete Materials: As specified in applicable State or Local Standard Specifications
- B. Cement:
 - 1. Type I, Type II, Type I/II and Type III Portland cement shall conform to the requirements in ASTM C 150 with the following additional requirements.
 - a. Portland cement shall not contain more than 0.60 percent equivalent alkali.
 - b. Processing additions may be used in the manufacture of the cement, provided such materials have been shown to meet the requirements of ASTM C 465 and the total amount does not exceed 1 percent of the weight of Portland cement clinker.
 - 2. Interground and Blended Cement shall conform to the requirements in ASTM C 595 with the following additional requirements:
 - a. Interground/Blended cement Type IP
 - (i) Type IP(25) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 25%+/-2%
 - (ii) Type IP(20) shall be composed of Class F fly ash or Class N pozzolan replacement shall be 20%+/-2%
 - b. Interground/Blended cement Type IT
 - (i) For SCMs, slag cement and limestone, the maximum replacement by weight shall be 40%. The manufacturer has a production tolerance of +2% from the proposed replacement.
 - (ii) For slag cement, the maximum replacement shall be 20% or less when incorporated into the final Interground/Blended cement.

- (iii) For limestone cement, the replacement range shall be from 5.1% to 10.0% when incorporated into the final Interground/Blended cement.

C. Fine and Coarse Mix Aggregate:

- 1. Mineral aggregates shall be crushed rock, broken stone, gravel, sand-gravel, coarse sand, fine sand, or a mixture of these materials composed of clean, hard, durable, and uncoated particle.
- 2. Shall meet the requirements in ASTM C 33.
- 3. Aggregates shall be free from injurious quantities of dust, soft or flaky particles, loams, alkali, organic matter, paper, wood, or other deleterious matter as determined by Engineer.
- 4. Free of materials with deleterious reactivity to alkali in cement.

D. Fly Ash: Class F, ASTM C 618 and ASTM C 311.

- 1. The use of Class C Fly Ash is not acceptable in any concrete on this project.

E. Water:

- 1. Shall meet the requirements in ASTM C 94 and potable.
- 2. Water shall be free from objectionable quantities of oil, acid, alkali, salt, organic matter, or other deleterious materials.

F. Air-Entrainment Admixture: Shall meet the requirements of ASTM C 260.

G. Other Chemical Admixtures:

- 1. See applicable State or Local Standard Specifications
- 2. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of concrete.
- 3. Admixture shall not contain more than 1 percent of chlorides calculated as calcium chloride.

2.04 ACCESSORIES

A. Joint Filler: Preformed, nonextruding, bituminous type, AASHTO M 33.

B. Liquid Membrane-Forming Compounds for Curing Concrete: White pigmented, AASHTO M 148, Type 2.

C. Reinforcement Accessories:

- 1. Tie Wire: Annealed, minimum 16 gauge.
- 2. Chairs, Bar Supports, Bolsters, Spacers, and other devices for spacing: Sized and shaped for adequate support of reinforcement during concrete placement.

2.05 CONCRETE MIX DESIGN

A. Street and roadway paving, alleys, driveways, trails, curb and gutter and parking areas.

- 1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
- 2. Admixtures: Add approved admixture at rate recommended by manufacturer.

B. Sidewalks:

1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
 2. Admixtures: Add approved admixture at rate recommended by manufacturer.
- C. Fountain / Splashpad
1. Concrete Strength: Minimum compressive strength at 28 days in pounds per square inch (psi) - 4,000 psi.
 2. Slump: 0.75 inches – 4.00 inches (maximum slump may be exceeded by use of a water-reducer, high-range water reducer, or both. Any increase in slump must be pre-approved by Engineer).
 3. Maximum water-cement ratio: 0.42

2.06 MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix and deliver according to ASTM C 94 and ASTM C 1116 and furnish batch ticket information.
1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1 1/2 hours to 75 minutes. When air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.
- B. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1.5 minutes and not more than 5 minutes.
- C. Transit Mixers: Comply with ASTM C 94.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradient and elevation of base are correct.
- C. Review project site to coordinate construction activities.

3.02 SUBGRADE

- A. In compliance with requirements Section 01 10 00 - Special Provisions, subgrade preparation or subgrade stabilization section and the recommendations of the geotechnical report for subgrade preparation requirements.

3.03 PREPARATION

- A. Moisten subgrade to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole frames with oil to prevent bond with concrete.
- C. Notify Engineer a minimum of 48 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damage to concrete.

- C. Place vertical joint filler in position and in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement as indicated in the plans.
- B. Keep reinforcement clean and free from foreign materials.
- C. Furnish and install suitable supports for all reinforcing steel and dowel bars.
- D. Tying Reinforcement:
 - 1. Tie reinforcing bars securely in place at all points where bars cross other reinforcing bars.
 - 2. Tie epoxy coated reinforcing bars with plastic coated ties.
 - 3. After tying epoxy coated reinforcing, perform holiday test. Repair any damaged epoxy coating. Retest.
- E. Lubricate dowel bars as shown in the plans.
 - 1. Lubricate to form a complete and continuous film over portion of bar being coated.
 - 2. Coating to be sufficient to break bond between dowel bars and concrete.
 - 3. Lubricant to have sufficient contrast with bar to be easily seen.
- F. Placement of Dowel Bars:
 - 1. Mid-depth of slab.
 - 2. Parallel with finished surface of slab.
 - 3. Parallel with centerline of roadway.
- G. Dowel Bar Placement:
 - 1. Baskets, or
 - 2. Approved mechanical inserters, or
 - 3. Free end of dowels supported in a frame to properly maintain alignment.
- H. Longitudinal Tie Bar Placement:
 - 1. Support on bar pins, or
 - 2. Approved mechanical inserter.
- I. Longitudinal Tie Bar Placement in Key-Type Joint:
 - 1. Bend at 90 degrees at center to facilitate placement.
 - 2. Before placing adjacent slab, bend at 45 degrees to longitudinal joint.
 - 3. Replace bars that crack or break (see applicable State or Local Standard Specifications).
 - 4. Replace cracked or broken bars at no cost to Owner.

3.06 PLACING CONCRETE

- A. Construction methods in accordance with applicable State or Local Standard Specifications

- B. Ensure reinforcement, inserts, embedded parts and formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- D. Keep concrete manipulation to a minimum when bringing concrete to proper line and grade.
- E. Adjust forward speed of finishing machines so that operations are continuous and uninterrupted.
- F. Addition of water to the surface of the concrete to assist finishing operations is not allowed.
- G. Remove laitance and surplus water while concrete is still plastic.
- H. Test surface for smoothness and true to line and grade with 10-foot straightedge.
 - 1. Set parallel with centerline.
 - 2. Lap half-length on each successive position.
 - 3. Remove high areas, fill depressions and consolidate concrete with hand floats.
- I. Texture concrete over full width of surface in the longitudinal direction.
 - 1. Use wet burlap, carpet or canvas belt.
 - 2. Suspend drags with a mandrel or similar device to insure a uniform texture.
 - 3. Remove drag from surface of concrete when the paving train is not in motion 30 minutes or more.
 - 4. Rinse or wash drags as necessary to obtain a uniform surface.
 - 5. Replace drags which cannot be cleaned.
 - 6. Remove concrete over joints after final drag finish.
- J. Use edging tool to round joints and edges of concrete along the side forms.

3.07 JOINTS

- A. Align curb, gutter and sidewalk joints.
- B. Place preformed expansion joint materials as shown in the plans.
 - 1. Form joints with joint filler extending from the bottom of the concrete to within 1/2 inch of finished surface.
 - 2. Secure to resist movement while placing concrete.
- C. Provide keyed joints as shown in the plans.
- D. Construction Joints:
 - 1. Begin initial sawing when concrete can support the weight of the saw and sawing does not create raveling. Early entry or soft cut sawing will be allowed.
 - 2. Complete sawing before random cracking occurs.
 - 3. Cut each traverse joint in one continuous pass.

4. Discontinue sawing of joint if a crack occurs at or near the joint location before sawing or a crack develops ahead of the saw. Route these cracks to a depth of 1 1/2 inches and 0.4 to 0.6 inches wide and seal with joint sealers.
5. Any spalling of joints to be repaired in accordance with applicable State or Local Standard Specifications.

3.08 FINISHING

- A. Roads, Streets, Alleys and Parking Areas: Use wet burlap, carpet or canvas drag.
- B. Driveways and Sidewalks:
 1. New Concrete Abutting Existing Concrete: Match existing texture.
 2. New Construction: Steel floating with light broom finish.
- C. Trails:
 1. Use wet burlap, carpet or canvas drag; or float and light broom finish texture perpendicular to direction of travel.
 2. 1/4-inch radius edge and transverse cut joints.
- D. Curb Ramps:
 1. Meet minimum design standard in accordance with requirements of applicable State or Local Standard Specifications
 2. Float and light broom finish.
 3. Truncated Domes - Detectable Warning Panels
 4. Americans with Disabilities Act (ADA) approved detectable warnings.
- E. Splashpad
 1. Heavy broom finish
- F. Apply liquid membrane-forming compounds for curing concrete immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 JOINT SEALING

- A. Preparation:
 1. Seal joints according to manufacturer's recommendations.
 2. Clean joints prior to filling joints with joint sealer.
- B. Filling:
 1. Top surface of joint material to be approximately 1/4 inch below surface of concrete.
 2. Remove overflow material.
 3. Repair overfilled joints by reinstalling the joint filler.
- C. If adhesion is not satisfactory, the material will be removed and the joint cleaned and resealed at no cost to Owner.
- D. All joints will be sealed including joints between existing and new concrete.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/8 inch in 10 feet.
- B. Maximum Variation from True Position: 1/4 inch.
- C. All concrete shall meet or exceed the strength requirement of the specifications.

3.11 DEFECTIVE CONCRETE

- A. All materials which Engineer determines to be damaged, defective, or otherwise unsuitable for use will be rejected and shall be removed and replaced at Contractor's expense.
- B. Contractor will be required to take corrective measures for high spots by removal and replacement, or by grinding with a machine equipped with multiple diamond blades with spacers to the required profile. If grinding is used, utilize methods which do not break the cement and aggregate bond. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measure will be done at Contractor's expense.
- C. Contractor will be required to take corrective measures for low areas that pond water by removal and replacement of concrete or by grinding with a machine equipped with multiple diamond blades with spacers to the required profile. If grinding is used, utilize methods which do not break the cement - aggregate bond. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer and Owner approval prior to performing corrective measures. The approved corrective measure will be done at Contractor's expense.
- D. Contractor will be required to take corrective measures for any cracking of concrete no matter what the cause. The corrective measures may include routing and sealing the cracks or removal and replacement. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- E. Joints: Contractor will be required to take corrective measures for any joints that in the opinion of Engineer are not constructed per the plans and specifications. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- F. Contractor will be required to take corrective measures for any concrete containing excessive honeycombing, spalling, fractures, chips or other defects at no additional cost to Owner. The corrective measures may include repairing concrete or removal and replacement of concrete. Engineer will determine whether defective concrete will be repaired, or if it will be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.
- G. Contractor must protect the concrete from damage due to rain, premature drying, excessive hot or cold temperatures, foot traffic and vehicular traffic. Failure to properly

protect concrete may constitute cause for repairing or for removal and replacement of defective concrete. Engineer will determine whether defective concrete shall be repaired, or if it shall be rejected and removed and replaced. Contractor shall submit the proposed corrective action plan to address the defective concrete and receive Engineer AND Owner approval prior to performing corrective measures. The approved corrective measures will be done at Contractor's expense.

3.12 FIELD QUALITY CONTROL

- A. An independent testing agency employed by Owner shall perform field quality control tests as specified in Section 01 40 00 - Quality Requirements.
1. Results of testing will be furnished in a timely manner to Owner, Engineer and Contractor, in writing.
 2. Contractor shall provide free access to concrete operations at project site and cooperate with testing agency.
 3. Contractor shall submit proposed mix design of each class of concrete to Engineer and testing agency for review at least 10 days prior to commencement of concrete operations.
 4. Field testing and laboratory testing of concrete will be performed by testing agency employed by Owner to determine conformance with specified requirements.
 5. Strength Testing
 - a. Compressive Strength Test Samples: ASTM C 39. For each test, mold and cure 3 concrete test cylinders. A set of 3 test cylinders shall be collected for every 100 cubic yard or fractional part thereof for each class of concrete placed in a day. At least one set of cylinders is required for each day concrete placement takes place.
 - (i) One additional cylinder may be required for a break prior to 7 days.
 - (ii) Take 1 additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
 - b. Maturity Method for Estimating Strength: ASTM C 1074. The Contractor may elect to utilize the maturity curve method to determine concrete strength. The Contractor must notify the Engineer in writing and submit a Plan with any changes applicable with State or local standard specifications.
 6. Perform 1 slump test for each set of test cylinders taken.
 - a. If the concrete mixture is excessively wet causing segregation, excessive bleeding, or any other undesirable condition, the concrete shall be rejected.
 - b. If the slump is outside the allowable limits specified the load of concrete shall be rejected.
 7. Perform 1 air content test for each set of test cylinders taken.
 - a. If the air content is less than the minimum specified, only one addition of air-entraining admixtures is allowed.

- b. If the air content is then outside the allowable limits the load of concrete shall be rejected.
- B. The independent testing agency employed by Owner will maintain records of placed concrete items and Contractor shall assist testing agency as necessary to accomplish the completion of this record keeping. Records will include; type of test samples taken, all test results, date and location of sample collected, concrete test cylinder number, quantity of concrete placed and slump, air content, air temperature test results.
- C. Additional Tests: The testing agency employed by Owner shall make additional tests of concrete, as directed by Engineer, when test results indicate that slump, air entrainment, compressive strengths or other requirements have not been met.
 - 1. The cost for this additional testing will be paid for by Contractor.
 - 2. If any additional testing is required to isolate failures, this shall be considered retests and shall be paid for by Contractor.

3.13 PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, foot traffic, vehicular traffic and rain events.
- B. Do not permit pedestrian traffic over concrete for a minimum of 2 days after finishing.
- C. Do not permit vehicular traffic over concrete for a minimum of 7 days and after design strength of concrete has been achieved.

END OF SECTION

**SECTION 32 13 13.20
POST-TENSIONED CONCRETE COURTS**

PART 1. GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Cast-in-place concrete criteria for the slab-on-grade and perimeter beams.
2. Post-tensioning material including stands, sheathing, anchorages, distribution plates, space bars, support chairs, and anchorage zone.
3. Post-tensioning operations, including stretching and anchoring.
4. Excavation, forming, and layout of perimeter beams, perimeter fencing, net posts, footings, and slab control joints.
5. Vapor barrier.
6. Grouting.

- B. Related Sections include the following:

1. Section 31 23 13 – Subgrade Preparation
2. Section 32 13 13 – Concrete Paving
3. Section 32 31 13 – Chain Link Fences and Gates
4. Section 32 31 13.30 – Pickleball Court Equipment

1.3 REFERENCES

- A. Post-tensioning strands and anchorages shall conform to the “PTI Guide Specifications for Post-Tensioning Materials.”

1.4 SUBMITTALS

- A. Shop Drawings: Include the following:

1. Design Mixture: For each mixture.
2. Cable layout with dimensions.
3. Cable and sheathing profiles showing support chair heights. Indicate location and method of tendon support.
4. Details of special reinforcement at cable anchorage points.
5. Details, location, and arrangement of cable dead end and stressing end anchorage devices.
6. Cable placing sequence and details.
7. Details of grade beam with perimeter chain link fence, and post footings.

- B. Quality Control Submittals:

1. **Design Calculations: Submit a set of design calculations. Design of post-tensioned courts shall be under the direct supervision of a professional engineer registered in the State of Nebraska responsible for their preparation and shall bear the engineer's seal and signature.**
2. Post-Tensioning Procedure: Furnish complete post-tensioning procedures for a double court, or as shown on the Drawings, to include the following:
 - a. Jacking sequence and methods.
 - b. Jacking force and jack pressure.
 - c. Maximum temporary jacking force and jack pressure.
3. Test Results and Certifications: Submit the following for review and acceptance by the Architect not less than three weeks prior to commencement of the Work:
 - a. Mill Tests: Results of certified mill tests, including typical stress-strain curve, for each production lot from which project material will be taken. Such results shall include guaranteed ultimate strength, yield strength, elongation, cross-sectional area and modulus of elasticity of the material tested.
 - b. Equipment Calibration Tests: Results of certified calibration tests made within the last three months by an independent testing agency of stressing equipment to be used on the Project. Stressing equipment shall be calibrated as a unit consisting of jack, gauge, and pump. Components of calibrated units may not be interchanged during the work without recalibration. Contractor shall submit method of identification of stressing units. Calibration reports shall include a curve related jack forces to gauge readings.

1.5 QUALITY ASSURANCE

- A. Contractor Qualifications: Stressing of tendons shall be under the immediate control of contractor experienced in this type of work. Exercise close check and rigid control of operations as necessary for full compliance with Contract Document requirements.
- B. Concrete Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI- certified Concrete Flatwork Technician.
- C. Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- D. Concrete Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. Design Criteria: Design of post-tensioned concrete courts, fence post footings, and grade beam shall include a 100% solid surface 10 feet height court fencing into the design calculations to accommodate a windscreen material installed onto the chain link fabric. Design shall be under the direct supervision of a professional engineer registered in the State of Nebraska and shall bear the engineer's seal and signature.
- F. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to post tension concrete, including but not limited to, the following:
 - a. Concrete mixture design.
 - b. Quality control of concrete materials and concrete paving construction practices.
2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete paving subcontractor.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Storage and Protection: Protect post-tensioning cables and anchorage devices against damage and rust or other results of corrosion at all times from the time of manufacture to final stressing. Material that has sustained physical damage at any time shall be rejected.
- B. Tendons shall not be subjected to extreme temperatures, welding sparks, or electric ground currents. Welding or burning operations shall not take place in the vicinity of exposed tendons until adequate protection has been provided to protect the tendons from such exposure. Torch cutting of exposed tendon ends is permitted after stressing.

1.7 PROJECT CONDITIONS

- A. Contractor is responsible for taking precautions to ensure that the stressing operation is conducted in a safe manner.
- B. Concrete Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- C. Concrete Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:
 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2. PRODUCTS

2.1 PRE-STRESSING TENDONS

- A. ACI Publications: Comply with ACI 423.7 unless otherwise indicated.
- B. Pre-stressing Strand: ASTM A416/A416M, Grade 270 (Grade 1860), uncoated, seven-wire, low-relaxation, 0.5-inch- (12.7-mm-) diameter strand.
- C. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties; chemically stable and nonreactive with pre-stressing strand, non-prestressed reinforcement, sheathing material, and concrete. Strands shall be coated with a permanent rust preventative lubricant.
- D. Tendon Sheathing:
 - 1. Material: Polyethylene or polypropylene with a minimum density of 0.034 lb/cu. in. (0.9 g/cu. cm).
 - 2. Minimum Thickness: 0.050 inch (1.25 mm).

2.2 NON-PRESTRESSED STEEL BARS

- A. Support Bars, Reinforcing Bars, and Hairpins:
 - 1. Steel: ASTM A615/A615M, Grade 60 (Grade 420), deformed.
- B. Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening tendons and tendon support bars 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. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.3 VAPOR BARRIER

- A. Sheet Vapor Barrier: Provide a vapor barrier which conforms to ASTM E 1745, Class A. The membrane shall have a permeance of less than 0.01 perms after mandatory conditioning tests per ASTM E 1745 (7.1.1 – 7.1.5) when tested in accordance with ASTM E 96. Vapor barrier shall not be less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape and pipe penetration boots. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Stego Industries, LLC; Stego Wrap, 15 mil Vapor Barrier
 - b. Fortifiber Building Systems Group; MoistopUltra 15
 - c. Reef Industries; VaporBlock 15.
- B. Vapor Barrier Accessories:
 - 1. Seams: Stego Industries LLC; Stego Tape.
 - 2. Penetrations of Vapor Barrier:

- a. By Stego Industries LLC; Stego Mastic.
 - b. By Stego Industries LLC; Stego Tape.
3. Perimeter / Edge Seal:
- a. Stego Industries LLC; Stego Crete Claw.
 - b. Stego Industries LLC; Stego Term Bar.
 - c. Stego Industries LLC; StegoTack Tape (double sided).
 - D. Use of one-sided seaming tape to seal the perimeter must be submitted to the architect for pre-approval

2.4 CONCRETE

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project.
- 1. Portland Cement: ASTM C 150, Type I/II, gray.
- C. Normal weight aggregates shall meet requirements of ASTM C33, and shall be from a source approved by the Nebraska Department of Roads.
- 1. Coarse aggregate shall be crushed limestone with gradation meeting requirements of Nebraska Department of Roads coarse aggregate for Class 47B concrete. Coarse aggregates shall be a minimum of 30 percent of total aggregate.
 - 2. Fine aggregate shall be sand gravel with gradation meeting requirements of Nebraska Department of Roads sand gravel.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Accelerating Admixture: ASTM C 494/C 494M, Type C.
 - 4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 5. Water Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
 - 6. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 7. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
- F. Concrete Mixtures: Proportion normal-weight concrete mixtures as indicated.
- 1. Footings:
 - a. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.
 - b. Maximum Water-Cementitious Materials Ratio: 0.50.

- c. Slump Limit: 4 inches (100 mm) or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
 - d. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
2. Court Slab: Concrete mixture shall be designed to minimize shrinkage and curling, and meet the following criteria:
- a. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
 - b. Coarse Aggregate: ASTM C 33, 1-inch nominal maximum size.
 - c. Maximum Water-Cementitious Materials Ratio: 0.45
 - d. 40% minimum of total aggregate shall be coarse aggregate.
 - e. Slump Limit: 5 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
 - f. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch (25-mm) nominal maximum aggregate size.
 - g. Water shall not be added at the jobsite.

PART 3. EXECUTION

3.1 FORMWORK

- A. Provide formwork for post-tensioned courts as specified in Division 32. Place vapor barrier over prepared Subgrade prior to placement of tensioning cables and support system.

3.2 SITE PREPARATION

- A. Refer to Section 31 for site and subgrade preparation.

3.3 POST-TENSIONED CONCRETE SLAB

- A. Install tendons according to installation drawings and procedures stated in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
 - 1. Tolerances: Comply with tolerances in ACI 423.7 for beams and slabs.
- B. Tendon Supports: Provide continuous slab bolsters or bars supported on individual high chairs spaced at a maximum of 42 inches (1070 mm) o.c. to ensure tendons remain in their designated positions during construction operations and concrete placement.
 - 1. Tendons shall be supported on chairs and loosely tied at height of 2 inches at all intersections to prevent vertical and horizontal movement during placement of concrete. Tendons shall be placed no more than 2'-6" on center in both directions.
- C. Expansion- and Isolation-Joint-Filler Strips: Extruded closed-cell polyethylene foam material with built in tear off strip for application of sealant after concrete hardens.
 - 1. Place full depth of slab next to walks or walls.
- D. Install a galvanized metal key-cold joint at net line and between courts.

- E. Provide pre-set sleeves for net posts, perimeter fencing, and net tie-downs.
- F. Install a 5-inch (150-mm) thick post-tensioned concrete slab. Concrete mix to be a minimum of 4,000 psi at 28 days. Use non-reactive aggregates according to ASTM C 33. Concrete mix shall be pumped with laser-screed placement.
- G. Concrete Placement: Place concrete as specified under Division 32. Take special precautions to ensure proper consolidation of concrete around cable anchorages. Concrete shall be placed in one continuous operation without joints except for construction joints as described in this Article. Slab thickness shall be minimum 5 inches, utilizing a minimum 60-foot-long continuous mechanical screed. Finish surface of concrete shall meet flatness tolerance of 1/8-inch in 10 feet. Flood courtsurface to verify slope, drainage, and lack of ponding areas.
- H. Construction Joints: Provide keyed construction joints between each individual court and at net line of each court. No other joints shall be allowed.
- I. Provide medium broom finish.
- J. Cables to be stressed at minimum strength of 3,000 psi concrete strength.

3.4 VAPOR BARRIERS

- A. Plastic Vapor Barriers: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
 - 2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
 - a. Seal vapor barrier to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions,
OR
 - b. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
 - 3. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
 - 4. Apply seam tape/Stego Crete Claw to a clean and dry vapor barrier.
 - 5. Seal all penetrations (including pipes) per manufacturer's instructions.
 - 6. Avoid the use of non-permanent stakes driven through vapor retarder.
 - 7. If non-permanent stakes are driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
 - 8. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
 - 9. Prior to concrete placement, receive letter from vapor barrier manufacturer verifying installation is per ASTM E1643.

3.5 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Provide water cured or 2-mil polyethylene blanket for curing. No cure agents to be placed on concrete except for cure agents approved by the court surfacing manufacturer.
- C. Curing of concrete surfaces per recommendations of acrylic surfacing manufacturer.

3.6 FORM REMOVAL

- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

3.7 TENDON STRESSING

- A. Calibrate stressing jacks and gages at start of project and at least every six months thereafter. Keep copies of calibration certificates for each jack-and-gage pair on Project site that are available for inspection. Exercise care in handling stressing equipment to ensure that proper calibration is maintained.
- B. Stress tendons only under supervision of a qualified post-tensioning superintendent.
- C. Do not begin stressing operations until the concrete compressive strength has reached 3,000 psi as indicated by tests of field-cured cylinders. Strength of concrete in place shall be determined according to ACI 301. Contractor may make additional cylinders at his expense to determine correct strength.
- D. The tensioning operation shall be conducted utilizing methods, procedures, and equipment as recommended by the manufacturer of the tensioning materials.
- E. Cut strand tail between 1/2 and 3/4 inch (13 and 19 mm) from wedges. Do not damage tendon or concrete during removal of strand tail. Paint ends with rust preventative paint. Cone holes shall be grouted flush with edge of slab.

END OF SECTION 32 13 14

**SECTION 321413
PRECAST CONCRETE UNIT PAVING**

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 this section.
 - 1. See Section 007300 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Precast Concrete Unit Paving as indicated on the plans and as herein specified.
- B. This Section includes the following:
 - 1. Concrete pavers set on concrete base.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. See Section 033000 "Cast-In-Place Concrete" for job-built edge restraints and base slab.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Concrete Unit Pavers
 - 2. Sieve Analysis for grading of aggregate base, bedding and joint sand.
- B. Product Material: For the following:
 - 1. Full-size units of each type of unit paver indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
 - 2. Aggregate setting-bed material for approval.
- C. Copy of Contractors ICPI Certificate

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

1. Installer shall hold a current certificate from the Interlocking Concrete Pavement Institute Concrete Paver Installer Certification Program (ICPI).
- B. Single-Source Responsibility: Obtain each color, type, and variety of unit pavers, joint materials, and setting materials from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying the work.
- C. Mock-up: Build mockups to verify surcharge of bedding sand layer, joint sizes, lines, laying patterns, colors and texture of the job. This area shall be the standard from which the work will be judged.
 1. Approved mockups may become part of completed work if undisturbed at time of Substantial Completion
- D. Pre-installation Conference: Conduct conference at project site

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect unit pavers and aggregate during storage and construction against soilage or contamination from earth and other materials.
 1. Wrap pavers in plastic or use other packaging materials that will prevent rust marks from steel strapping.
 2. Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing. Do not install sand or pavers during rain or snowfall.

2. PRODUCTS

2.1 CONCRETE PAVERS

- A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
 1. Manufactures: Subject to compliance with requirements
 - a. Pavestone
 - b. Belgard
 - c. Hanover
 - d. Unilock
 - e. Or equal, if and as specifically approved by Engineer/ Landscape Architect by Addendum during bidding period.
 2. Thickness: As indicated on drawings

3. Face size and Shape: As indicated on drawings
4. Color: As indicated on drawings

2.2 EDGE RESTRAINTS

- A. Job-Built Concrete Edge Restraints: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mixed concrete with minimum of 28-day compressive strength of 4000 psi.

2.3 SETTING-BED MATERIALS

- A. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate.
- B. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

3. EXECUTION

3.1 EXAMINATION

- A. Examine surfaces indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of unit pavers. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- B. Proof-roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction according to requirements in Division 31 Section "Earthwork". Do not proceed with installation of unit pavers until deficient subgrades have been corrected and are ready to receive subbase for unit pavers.

3.3 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- C. Cut unit pavers 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. Hammer cutting is not acceptable.
 1. For concrete pavers, a block splitter may be used.
- D. Joint Pattern: See drawings.

- E. Tolerances: Do not exceed 1/16-inch (1.5-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches (3 mm in 600 mm) and 1/4 inch in 10 feet (6 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- F. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
 - 1. Install job-built concrete edge restraints to comply with requirements in Division 03 Section "Cast-in-Place Concrete"

3.4 SETTING-BED PAVER APPLICATIONS

- A. Place separation geotextile over prepared subgrade, overlapping ends and edges at least 12 inches.
- B. Place sand for leveling course and screed to 1 inch thickness not to exceed 1 1/2" thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of laid pavers. Do not use bedding sand to fill depression in the base surface.
- C. Lay the pavers in the patterns as shown on the drawings. Maintain straight pattern lines. Set pavers with a minimum joint width of 1/16 inch (1.5 mm) and a maximum of 1/8 inch (3 mm), being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
 - 1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
- D. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf (16- to 22-kN) compaction force at 80 to 90 Hz. Perform at least 3 passes across paving with vibrator prior to working in joint sand. Vibrate under the following conditions:
 - 1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
 - 2. Before ending each day's work, fully compact installed concrete pavers within 36 inches (900 mm) of the laying face. Cover the open layers with nonstaining plastic sheets overlapped 48 inches (1200 mm) on each side of the laying face to protect it from rain.
- E. Spread dry joint sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- F. Do not allow traffic on installed pavers until sand has been vibrated into joints.
- G. Repeat joint-filling process 30 days later.

3.5 REPAIR, CLEANING, AND PROTECTION

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

- B. Provide final protection and maintain clean surface conditions in a manner acceptable to Installer and architect that ensure the unit paver work is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

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**SECTION 32 15 00
AGGREGATE SURFACING**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Aggregate surfacing.

1.02 REFERENCES

- A. State Standard Specifications, latest revision.

1.04 QUALITY ASSURANCE

- A. Aggregate surfacing shall meet the specifications in the Standard Specifications, for gravel and crushed rock surfacing.
- B. Submit a recent analysis from proposed aggregate source showing compliance with the specifications.

PART 2 - PRODUCTS

2.02 CRUSHED ROCK SURFACING (ROADS, DRIVEWAYS, PARKING AREAS, TEMPORARY SURFACING)

- A. State of Nebraska crushed rock surfacing gradations:

¾" Crushed Rock for Surfacing Gradation Limits	
Sieve Size	Percent Passing
1 inch	100
No. 4	20-60
No. 10	0-30
No. 200	0-10

1-1/2" Crushed Rock for Surfacing Gradation Limits	
Sieve Size	Percent Passing
1"	100
¾"	65-95
3/8"	30-70
No. 10	10-30
No. 200	0-10

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify compacted subgrade is dry and ready to receive work of this section.
- B. Verify gradients and elevations of subgrade are correct.

C. Beginning of installation means acceptance of existing conditions.

3.02 PLACING AGGREGATE SURFACING

- A. Spread material over prepared subgrade to a total compacted thickness as shown in the plans
- B. Level surfaces to elevations and gradients indicated.
- C. Compact placed aggregate materials by rolling.
- D. Perform hand tamping in areas inaccessible to compaction equipment.
- E. Add moisture as needed to supplement the compaction process.

END OF SECTION

SECTION 32 17 23
PAVEMENT MARKING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Painting.

1.02 REFERENCES

- A. Nebraska Department of Transportation (NDOT) Standard Specification for Highway Construction, 2017 Edition, including all current supplemental specifications.
- B. Current Edition of Manual of Uniform Traffic Control Devices (MUTCD) including all current updates.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 00 13 00.
- B. Provide product data on all finishing products.
- C. Submit manufacturer's application instructions under Section 00 13 00.

1.04 REGULATORY REQUIREMENTS

- A. All paint used for intermediate and finish coats shall be lead-free, mercury-free, fume proof and suitable for use on pavement.
- B. All tape shall be weather resistant.

1.05 QUALITY ASSURANCE

- A. Product Manufacturer Company specializing in manufacturing quality paint and finish products with three years' experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- B. Minimum and Maximum Application Temperatures as per manufacturer's instructions.

PART 2 - PRODUCTS

2.01 PERMANENT PAVEMENT MARKING PAINT

- A. As per NDOT approved products list and NDOT Section 423.02.

2.02 GLASS BEADS

- A. As per NDOT approved products list and NDOT Section 423.02.

2.03 PAVEMENT MARKING TAPE

- A. As per NDOT approved products list and NDOT Section 423.02.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

3.02 PREPARATION

- A. Apply products in accordance with manufacturer's instruction and NDOT Section 423.03.

3.03 PROTECTION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop clothes, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

3.04 APPLICATION

- A. Apply products in accordance with manufacturer's instruction and NDOT Section 423.03.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.

3.05 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work, maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.

- C. Collect cotton waste, clothes, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

END OF SECTION

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**SECTION 321726
TACTILE WARNING SURFACING**

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 this section.
 - 1. See Section 007300 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the cast-in-place Tactile Warning Tiles as indicated on the plans and as herein specified.
- B. This Section includes the following:
 - 1. Cast-in-Place Tactile Warning Tiles
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. See Section 033000 "Cast-in-Place Concrete" for additional requirements.
 - 2. See Section 310000 "Earthwork" for backfilling and subgrade preparation.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's literature describing products, installation procedures and routine maintenance.
- B. Samples for Verification Purposes: Submit two (2) tile samples minimum.
- C. Shop drawings are required for products specified showing fabrication details; composite structural system; plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure.
- D. Material Test Reports: Submit test reports from qualified independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet the properties indicated. All test reports shall be conducted on a cast-in-place tactile tile system as certified by a qualified independent testing laboratory.
- E. Maintenance Instructions: Submit copies of manufacturer's specified maintenance practices for each type of tactile tile and accessory as required.

1.4 QUALITY ASSURANCE

- A. Provide cast-in-place tactile tiles and accessories as produced by a single manufacturer.

- B. Installer's Qualifications: Engage an experienced Installer certified in writing by tactile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.
- C. Americans with Disabilities Act (ADA): Provide tactile warning surfaces which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act (Title 49 CFR TRANSPORTATION, Part 37.9 STANDARDS FOR ACCESSIBLE TRANSPORTATION FACILITIES, Appendix A, Section 4.29.2 DETECTABLE WARNINGS ON WALKING SURFACES).
- D. High Strength Concrete Panels shall be a average strength of 10,000 psi (69 MPa) and shall be reinforced with High Tensile 1/16" 7x7 304 Stainless Steel Tendons 4" on center both directions and both faces. Final prestress forces after losses shall be 300 lbs per tendon, resulting in a net panel prestress of 172 psi in both directions.
- E. Physical Properties of the Warning Panel Composite:
 - 1. Compressive Strength ASTM C39 average of 10,000 psi
 - 2. Slip Resistance ASTM D 2047 Modified greater than .80 wet or dry

1.5 DELIVERY, STORAGE AND HANDLING

- A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings and tile type shall be identified by part number.
- B. Tiles shall be delivered to location at building site for storage prior to installation.

1.6 SITE CONDITIONS

- A. Environmental Conditions and Protection: Temperature affects the setting time and rate of strength of concrete, ACI procedures for storing, mixing, and placing concrete in hot or cold weather are recommended. See ACI 305 "Standards on Hot Weather Concreting," or ACI 306 "Standard on Cold Weather Concreting"
- B. The use of water for work, cleaning or dust control, etc. shall be contained and controlled and shall not be allowed to come into contact with the passengers or public. Provide barricades or screens to protect passengers or public.
- C. Disposal of any liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.
- D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on the site.

1.7 WARRANTY

- A. The manufacturer shall warrant the detectable tactile panels to be free from defect for a period of 12 months from date of substantial completion. The installation contractor shall warrant the installation to be free from defects for the same period. Warranty does not cover damage in whole or in part by conditions beyond the control of the manufacturer or installer, including but not limited to: use for which the materials is not designed; casualty; faulty design or

construction; failure of the substrate; damage caused by neglect or improper maintenance procedures or other causes not specified. The warranty is in lieu of all other warranties, expressed or implied, including to any warranty of merchantability of fitness for a particular purpose.

2. PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
- B. The Detectable Warning Panel specified is based on panel manufactured by CASTinTACT (503) 234-4321. Existing engineered and filed tested products which are subject to compliance with requirements, may be incorporated in the work and shall meet or exceed the specified test criteria and characteristics.
- C. Color: Black. Color shall be homogeneous throughout the panel

2.2 MATERIALS

- A. The preformed panels shall be Cast in Tact Warning Panels as manufactured by Mason's Supply Company (503) 234-4321; or as approved by the Architect to be an equal.
- B. Local representatives of these products include Stetson Building Products (800) 383-1272 for Cast in Tact.

3. EXECUTION

3.1 INSTALLATION

- A. During all concrete pouring and tile installation procedures, ensure adequate safety guidelines are in place and that they are in accordance with the applicable industry and government standards.
- B. Temperature affects the setting time and rate of strength of concrete, standard ACI procedures for storing, mixing, and placing concrete in hot or cold weather are recommended. See ACI 305 "Standard on Hot Weather Concreting," or ACI 306 "Standard on cold Weather Concreting."
- C. Thickness of concrete under panels shall be increased 1" in depth. Prepare a well drained and properly compacted subgrade. Leave no puddling, standing water, ice, frost, or mud. Reference Section 310000 "Earthwork" for subgrade and compaction requirements.
- D. Position forms for proper grade, slopes and uniform slab thickness. Reference Section 321313 "Portland Cement Paving" for reinforcement and joint placement requirements.
- E. The concrete specified shall conform to contract documents with a maximum slump as required in Section 033000 "Cast-In-Place Concrete". Concrete shall be poured and finished to the proper grade and slope prior to tactile panel placements. Concrete thickness shall be increased 1" in depth beneath area receiving warning panels.

- F. Consult contract document for details on areas to receive detectable warning panels. Place panels at the bottom of curb ramps and other blended transitions. Detectable warning panels must have visual contrast with adjacent walking surface. Install across full width of ramp a minimum 24" in depth and set back 8" from bottom of curb. Provide adequate drainage to prevent the accumulation of water and debris on or at the bottom of ramp.
- G. Recess panels below finish grade with INSTALaTACT installation template tool before initial concrete is set and level base with wood float to leave on open surface.
- H. Pre-dampen back of CASTinTACT panels with potable water. Apply 1/8" thickness of CASTinTACT PremMix (3:1 ratio of powder to potable water) or (2:1:1 ratio of Portland cement, clean masons sand and potable water). Work into keyed surface on back of panel with rubber float for 100% surface coverage.
- I. Install Tactile Panels immediately in fresh concrete and lightly tap panels to grade using a rubber mallet to insure bond and 100% surface contact with square edges of panels butted tightly together. Tolerance between tactile panels and surrounding surfaces is 1/16" maximum. Immediately after placement re-check slope and elevation for proper grade.
- J. In environments subject to freeze thaw conditions, leave a 3/16" caulk joint between panels and seal with single component polyurethane sealant. Reference section 079200 "Joint Sealants"
- K. Finish surrounding concrete flush with tactile panels. Edge around panels with 1/8" radius edger and finish in accordance with project specifications.
- L. Clean concrete residue off panels with a damp hydra sponge to ensure a clean appearance.
- M. Fresh concrete surround tactile panels should be cured in accordance with ACI 308. Use Masco Curing compound meeting ASTM C 309. **Protect panels with a PROTECTaTACT or similar while spraying curing compound.**

3.2 CLEANING AND PROTECTING

- A. Protect tiles against damage during construction period to comply with tactile tile manufacturer's specification.
- B. Clean tactile tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project. Clean tactile tile by method specified by tactile tile manufacturer.

END OF SECTION

SECTION 32 18 23.53

ACRYLIC COLOR SURFACING FOR POST-TENSIONED CONCRETE COURTS

PART I – GENERAL

1.01 SCOPE OF WORK

- A. The contract work to be performed under this section consists of furnishing all required labor, materials, equipment, implements, parts and supplies necessary for the colored/texture surfacing of courts constructed with proper slope for positive drainage in accordance with these specifications.

1.02 QUALITY ASSURANCE

- A. Work is to be performed by contractor with a minimum of six (6) similar, successfully completed projects within the past two (2) years. The color surfacing foreman will be a Certified Installer of the color coating manufacturer. All surface coatings shall be supplied from a single manufacturer.

1.03 REFERENCES

- A. Post Tensioning Institute (PTI)
- B. American Concrete Institute (ACI)

1.04 SUBMITTAL

- A. Manufacturer specifications for components, color chart and installation instructions.
- B. Authorized Applicator Certificate from the surface system manufacturer.
- C. ITF Pace Classification Certificate for the system to be installed.
- D. Reference list from the installer of at least 6 projects of similar scope completed in the past 2 years.
- E. Current Material Data Safety Sheets (MSDS).
- F. Product Substitution: If other than the product specified, the contractor shall submit at least 7 days prior to bid date a complete type written list of proposed substitutions with enough data, drawings, samples and literature to demonstrate to the architect/engineer's satisfaction that the proposed substitution is of equal quality and utility to that originally specified. Information must include a QUV test of at least 2000 hours illustrating the UV stability of the system. Test method similar to ASTM G154. The color system shall have an ITF pace rating in Category 3 (medium). Under no circumstances will systems from multiple manufacturers be considered.

1.05 LIMITATIONS FOR APPLICATION OF SURFACING

- A. Application temperature shall be a minimum of 50°F in direct sunlight with no shade. Do not apply coatings if temperatures are at or below 40°F at night. The surface temperature shall also not exceed 140°F. Do not apply when surface is wet or if rain is imminent or forecasted. Keep all coatings from freezing. Do not store in direct sunlight for an extended period. Containers shall be closed when not in use.

1.06 WARRANTY

- A. Contractor shall guaranty that all materials and workmanship incorporated into the project will be of new quality and free from defects, and that all work will be installed as specified and drawn, and in conformance with the project documents. Any material or workmanship found to be defective or out of specification will be replaced, at the sole cost of the contractor, for a period of one (1) year from date of acceptance.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A. RSS Color Coatings - 775 Canosa Court, Denver, CO 80204 (800) 738-8106
- B. Or approved equal.

2.02 ADHESIVE PRIMERS AND SEALERS

- A. Adhesion Primers - RSS Concrete Sealer and RSS Latex Concrete Primer- RSS Concrete Sealer is undiluted and RSS Latex Concrete Primer is mixed 1 gallon of RSS Latex to 4 gallons of clean potable water (1:4).

2.03 PATCHING MIX

- A. Patching Mix - RSS Rhino Patch Binder- is mixed 3 gallons of RSS Latex Patch Binder, 1 gallon of Portland Cement Type 1 or 2 and 100 lbs. of Silica Sand.

2.04 CRACK SEAL

- A. Crack Seal - RSS Epoxy Crack Seal or Rhino Crack Filler. The RSS Epoxy Crack Seal is mixed as a two (2) Parts Component A and one (1) Part Component B. Rhino Crack Filler is mixed 3 gallons of RSS Latex Patch Binder, 1 gallon of Portland Type 1 or 2 Cement and 100 lbs. of silica sand.

2.05 ACRYLIC RESURFACER

- A. Acrylic Resurfacer - RSS Acrylic Resurfacer. RSS Acrylic Resurfacer is mixed with 55 gallons of RSS Acrylic Resurfacer, 400 to 500 lbs. of Washed White Silica Sand and 20-28 gallons of clean potable water.

2.06 ACRYLIC COLOR PLAY SURFACE

- A. Acrylic Color Play Surface- The RSS Acrylic Color to provide an ITF Pace Rating Category 3 (medium) court surface which consists of the following mix- 55 gallons of RSS Acrylics Color Concentrate, 400 lbs. of Washed White Silica Sand (40-70 mesh) and 20 to 28 gallons of clean potable water.
- B. Coverage- 0.07 gallons/square yard. Weight per gallon- 12.0 lbs.

2.07 TAPE SEALER AND TEXTURED LINE PAINT

- A. Play Lines- RSS Tape Sealer and RSS Textured Line Paint. Lines shall be accurately located and marked. Lines shall be primed first with (1) coat of RSS Tape Sealer to ensure crisp edges. Playing lines shall be (2") wide and painted using RSS Textured White Line Paint.

PART 3 - EXECUTION

3.01 SURFACE PERPARATION

- A. Prior to the surfacing applications, the courts shall be thoroughly cleaned by Muriatic Acid Wash diluted with water. Pressure wash thoroughly to remove al residuals.
- B. Cracks and rock holes (if applicable) will be cleaned of debris and filled full depth and level with the playing surface using RSS Epoxy Crack Seal or RSS Rhino Crack Filler. RSS Rhino Crack Filler shall be ground smooth to court surface prior to the application of RSS Acrylic Resurfacer. RSS Epoxy Crack Seal shall have silica sand broadcast into wet mixture to provide texture.
- C. Flood the courts and after a (1) hour wait in direct sunlight with temperatures seventy (70) degrees and rising. Any areas of standing water remaining that cover a US Nickle shall be patched with RSS Rhino Patch Binder. Areas to receive patches shall be primed first with a mix of Water and RSS Latex Concrete Primer mixed at a 4:1 ratio. Reflood patches to ensure compliance. Light misting with water on the edges to feather out is allowed as needed to maintain workability.

3.02 LATEX CONCRETE PRIMER

- A. Apply one (1) coat of RSS Latex Concrete Primer using 1 gallon of Latex mixed with 4 gallons of clean potable water. Apply with a rubber bladed squeegee to aid in the mechanical bonding of the RSS Coating System to the concrete substrate. Apply the first coat of RSS Acrylic Resurfacer while Latex Primer Coat is tacky to the touch. Care should be taken not to leave any puddles of material.

3.03 ACRYLIC RESURFACER

- A. In order to provide a smooth underlayment for RSS Color Coating Systems one (1) coat of RSS Acrylic Resurfacer shall be applied over each court per the mix ratio stated in Section 2.05. The mixture will be agitated in a paddled mortar mixer or in drums to provide a consistent and homogeneous solution. The acrylic resurfacer coat shall provide a uniform surface with no ridges.

3.04 ACRYLIC COLOR

- A. Two (2) coats of color mixture (3 coats may be required depending on concrete texture) will be agitated in a paddled mortar mixer or drum to provide a consistent and homogeneous solution. The mixture will be applied over the entire court surface using a rubber-tipped squeegee in two separate applications with enough drying time allowed between coats per mix ratio stated in Section 2.06. The finished color surface is to be free of ridges and shall have a uniform appearance.

3.05 PLAYING LINES

- A. All lines will be painted first with (1) coat of RSS Tape Sealer to provide a uniform crisp line. Once the Tape Sealer has dried apply one (1) coat of RSS White Textured Line Paint two inches (2") wide which shall be accurately located and marked by snapping a chalk line and placing (1"+) masking tape using a line taper. All lines shall conform to USTA Specifications for doubles play.

3.06 PROTECTION

- A. Erect temporary barriers to protect coatings during drying and curing if needed.
- B. Lock gates to prevent use or entry until acceptance by the owner's representative.

3.07 CLEAN UP

- A. Remove all containers, surplus materials and debris. Dispose of materials in accordance with local, state and federal regulations.
- B. Leave site in a clean orderly condition.

END OF SECTION

SECTION 323113

CHAIN LINK FENCES AND GATES

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. See Section 007300 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Chain Link Fences and Gates as indicated on the plans and as herein specified.
- B. This Section includes the following:
 - 1. Chain-link Fence
 - 2. Gates: Swing
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 03 30 00 "Cast-in-Place Concrete" for Cast-in-place concrete
 - 2. Division 31 23 23 "Fill and Backfill" for excavation, filling, and backfilling
 - 3. Division 32 13 13.20 "Post-Tensioned Concrete Slab for Courts" for foundation requirements.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design chain-link fence and gates, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
 - a. Wind Speed: 90 mph.
 - b. Fence Height: See Drawings.
 - c. Line Post Group: IA, ASTM F 1043, Schedule 40 steel pipe.
 - d. Wind Exposure Category: C

2. Sizes for all fence posts shall be determined solely by the contractor based on information provided above, information listed in this specification and information provided on the drawings. Post sizes listed on the drawings are for information only and shall be confirmed by the contractor. Exact sizes for all posts required to accommodate stipulated conditions shall be incorporated as part of the base bid.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain link fence and gates.
 1. Fence and gate posts, rails, and fittings
 2. Chain-link fabric, reinforcements, and attachments
 3. Gates and hardware
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware, gate operation, and operational clearances.
- C. Samples for Initial Selection: For components with factory-applied color finish.
- D. Samples for Verification: Prepared on Samples
- E. Delegated-Design Submittal: For chain-link fence and gate framework indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Product Certificates: For each type of chain-link fence, and gate, from manufacturer.
- G. Product Test Reports: For framing strength according to ASTM F 1043
- H. Field quality-control reports
- I. Operation and Maintenance Data: For the following to include in emergency, operations, and maintenance manuals:
 1. Polymer finish
 2. Gate hardware
 3. Gate operator
- J. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced commercial installer who has completed chain-link fences and gates 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.
- B. Single-Source Responsibility: Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

- C. Mockups: Build mockups to set quality standards for fabrication and installation

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify layout information for fences and gates shown on the Drawings in relation to the property survey and existing structures. Verify dimensions by field measurements.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Faulty operation of gate operators and controls
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 1 years from date of Substantial completion.

2. PRODUCTS

2.1 CHAIN LINK FENCE FABRIC

- A. Steel Chain-Link Fence Fabric: Fabricated in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with (CLFMI) Product Manual and with requirements indicated below:
 1. Height: As indicated on drawings
 2. Selvage: Twisted on Top and Knuckled at bottom of fabric.
 3. Steel Wire Fabric: Wire with a diameter as indicated on drawings.
 - a. Mesh Size: as indicated on drawings
 - b. Zinc-Coated Fabric: ATTM A 491, Type II with zinc coating applied before or after weaving.

2.2 STEEL FENCE FRAMING

- A. Fence Posts and Rails: Comply with ASTM F 1043 for framing, including rails, braces, and line; terminal; and corner posts. Provide member with minimum dimensions and wall thickness according to ASTM F 1043.
 1. Fence Height: As indicated on drawings
 2. Heavy Industrial Strength: Schedule 40 galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 669, Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per sq. ft. Type A coating inside and outside according to ASTM F 1234, as determined by ASTM A 90

- a. Line Post: As required by Delegated-Design Submittal
 - b. End, Corner and Pull Post: As required by Delegated-Design Submittal
3. Horizontal Framework Members: Intermediate, top and bottom rails complying with ASTM F 1043
- a. Top Rail: As required by Delegated-Design Submittal
4. Brace Rails: Comply with ASTM F 1043
5. Metallic Coating for Steel Framing
- a. Zinc-Coated: Galvanized by hot-dip process

2.3 SWING GATES

- A. Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members maximum of 8 feet apart unless otherwise indicated.
- 1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.
 - 2. Bracing: Install diagonal cross-bracing consisting of 5/16-inch-diameter adjustable-length truss rods on gates to ensure frame rigidity without sag or twist.
- B. Swing Gates: Comply with ASTM F 900 for gate posts and swing gate types
- 1. Gate Leaf Width: Gates up to 8 feet wide
 - a. Up to 6 Feet High: Fabricate perimeter frames of 1.660-inch minimum OD
 - b. Over 6 Feet High: As required based on post frequency, post height, mesh weight, and design criteria listed previously
 - 2. Pipe and Tubing:
 - a. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing.
 - b. Gate Posts: Round tubular steel
 - c. Gate Frames and Bracing: Round tubular steel
 - 3. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
 - a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide hinges as indicated on drawings, or if not indicated, provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
 - b. Latch: Plunger-bar type to permit operation from either side of gate, with padlock eye.

2.4 FITTINGS

- A. Material: Comply with ASTM F 626 for all items required to complete fence system. Galvanize each ferrous metal item and finish to match framing.
 - 1. Steel and Iron: Unless specified otherwise, hot-dip galvanize pressed steel or cast-iron fence fittings and accessories with at least 1.2 oz. zinc per sq. ft. as determined by ASTM A 90.
- B. Post and Line Caps: Formed steel, cast malleable iron, weather tight closure cap for tubular posts. Provide one cap for each post. Where top rail is used, provide caps to permit passage of top rail.
- C. Rail and Brace Ends: Pressed steel per ASTM F626, for cup-shaped connection to receive rail and brace ends.
- D. Top Rail Sleeves: 7" expansion sleeve with a minimum .137" wire diameter and 1.80" length spring, allowing for expansion and contraction of top rail.
- E. Tension (stretcher) Bars: One piece lengths equal to 2" less than full height of fabric with a minimum cross-section of 3/4" wide x 3/16" thick. Provide tension bars where chain link fabric meets terminal posts.
- F. Tension Bands: Pressed steel, 14 gage thickness x 1" wide. Minimum 300 degree profile curvature for secure fence post attachment.
- G. Tension Wire: zinc coated steel wire per ASTM F1664 Class 2 b, 6 gauge diameter core wire with tensile strength of 75,000 psi.
- H. Brace Bands: Pressed steel, 12 gage thickness x 3/4" wide, per ASTM F-626.
- I. Truss Rods and tightener: Steel rods with minimum diameter of 3/8". Capable of withstanding a tension of minimum 2,000 lbs. Merchant quality with turnbuckle.
- J. Ties Wires, Clips, and Fasteners: According to ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, frames, complying with the following.
 - a. Hot-Dip Galvanized Steel

2.5 CONCRETE

- A. Concrete: Provide concrete as indicated in Section 03300 "Cast-In-Place Concrete."

3. EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect

B. Proceed with installation only after unsatisfactory conditions have been removed.

3.2 PREPARATION

- A. Stake location of fence lines, gates, and terminal posts. Do not exceed interval of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks and property monuments.

3.3 INSTALLATION, GENERAL

- A. Install fence to comply with ASTM F 567

3.4 CHAIN-LINK FENCE INSTALLATION

- A. Post Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacing's indicated, in firm, undisturbed or compacted soil.

1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

- B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect above ground portion of posts from concrete splatter.

- C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment.

- D. Line Posts: Space line posts uniformly as indicated on drawings.

- E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at mid-height of fabric 72 inches or higher, on fences with top rail and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

- F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire hog rings of same material

and finish as fabric wire, spaced at a maximum of 24 inches o.c. Install tension wire in location indicated before stretching fabric. Provide horizontal tension wire at the following locations.

1. Extended along top and bottom of fence fabric. Install tension wire through post cap loops. Install bottom tension wire within 3 inches of bottom fabric and tie to each post with not less than same diameter and type of wire.
- G. Top Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.
- H. Intermediate and Bottom Rails: Install and secure to post with fittings.
- I. Fabric: Fabric to be stretched taught to where there is no movement in the mesh when compressed and installed on court side of fence posts. Top rail and bottom rail ties to be 12" on center. Posts ties are to be 12" on center. Provide a minimum of six (6) ties for every 10' of rail and one (1) tie to each foot of post height. Ties for bottom tension wire shall be made with 9-gauge galvanized hog rings shall be spaced apart with (6) rings per ten feet 10' of tension wire.
- J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.
- K. Tension Bands
1. Provide one (1) tension bandy for every foot 1' of fabric height, minimum of (8) bands for 10' tall and (3) bands for 42" tall fences.
- L. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain link fence fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and braces at 24 inches o.c.
- M. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side

3.5 GATE INSTALLATION

- A. Install gates according to manufacturer's written instructions. Install gates plumb, level, and secure for full opening without interference. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary. Install gates according to manufacturer's instructions, plumb, level, secure and swing easily in either directions with no interference.

3.6 ADJUSTING

- A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire

operational range. Conform that latches and locks engage accurately and securely without forcing or binding.

- B. Lubricate hardware and other moving parts.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION

SECTION 32 3113.30

PICKLEBALL COURT EQUIPMENT

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. The contract work to be performed under this section consist of furnishing all required labor, materials, equipment, implements, parts and supplies necessary for, or appurtenant to, pickleball court equipment in accordance with these specifications.

1.02 WARRANTY

- A. Contractor shall guaranty that all materials and workmanship incorporated into the project will be of new quality and free from defects, and that all work will be installed as specified and drawn, and in conformance with the project documents. Any material or workmanship found to be defective or out of specification will be replaced, at the sole cost of the contractor, for a period of one (1) year from date of acceptance.

PART 2 – PRODUCTS

2.01 NET POSTS

- A. Douglas Premier XS Round, 2 7/8" OD posts 8-gauge steel. Posts shall have chrome plated drive gears and a continuous lacing rod. Ground sleeves to be schedule 40 PVC pipe or galvanized steel.
- B. Or approved equal

2.02 NETS

- A. Douglas JTN-30 net with 2-ply vinyl-coated polyester headband, weight 65 oz., 20oz/sq.yd., 3.5mm braided polyethylene netting with 1¾" mesh and net cable shall be ¼" diameter by 22' long for pickleball courts.
- B. Or approved equal

2.03 CENTER STRAPS

- A. Douglas Deluxe Center Strap. Strap is 2" wide, white polyester webbing with adjustable buckle and a double-ended snap hook.
- B. Or approved equal

2.04 CENTER STRAP ANCHOR

- A. Douglas 1 7/8" OD tubular anchor pipe, galvanized inside and out. One end will be flattened for anchorage into concrete foundation. A 5/16" OD anchor pin will be fastened through pipe near the top of the anchor.
- B. Or approved equal

PART 3 - EXECUTION

3.01 NET POSTS

- A. Net post sleeves for pickleball courts will be set in concrete foundations, 12" diameter x 24" deep for a post-tensioned concrete slab. Net posts to be located per the drawings and in conformance with the American Sports Builders Association and USTA specifications. Net post sleeves to be set flush with finished grade and 22' feet apart to the front of ground sleeves. Net Posts height shall be set at 36" to top of the post from finished grade of the court.

3.03 CENTER STRAP ANCHORS

- A. Center strap anchor will be set in 8" diameter x 12" deep concrete foundations flush with finished grade. Center strap anchor to be installed in the middle of the net posts.

3.04 NETS

- A. Tie net flush against net posts at 36" high at net posts with lacing twine for pickleball courts.

3.05 CENTER STRAPS

- A. Loop center strap around net, hook into anchor, and tighten so that the net is thirty-four inches 34" high from the top of finished grade in the center of the court.

END OF SECTION

SECTION 32 32 73
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Precompressed foam sealers.
- C. Hollow gaskets.

1.02 REFERENCES

- A. ASTM C 834 - Standard Specification for Latex Sealants; 2000.
- B. ASTM C 919 - Standard Practice for Use of Sealants in Acoustical Applications; 2002.
- C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2002.
- D. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2000.
- E. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2000.
- F. ASTM D 1667 - Standard Specification for Flexible Cellular Materials--Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam); 1997.
- G. ASTM D 2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for concrete Pavements; 1991 (Reapproved 1998).

1.03 SUBMITTALS

- A. Product Data: Provide data indicating sealant chemical characteristics.
- B. Samples: Submit two samples, 2x2 inch in size illustrating sealant colors for selection.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

1.04 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Applicator Qualifications: Company specializing in performing the work of this section with minimum two years experience.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 COORDINATION

- A. Coordinate the work with all sections referencing this section.

1.07 WARRANTY

- A. Correct defective work within warranty period.
- B. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silicone Sealants:

1. Bostik: www.bostik.com.
 2. Dow Corning Corp: www.dowcorning.com.
 3. GE Plastics: www.geplastics.com.
 4. Pecora Corporation: www.pecora.com.
 5. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 6. Tremco, Inc: www.tremcosealants.com.
- B. Polyurethane Sealants:
1. Bostik: www.bostik.com.
 2. Pecora Corporation: www.pecora.com.
 3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 4. Tremco, Inc: www.tremcosealants.com.
- C. Polysulfide Sealants:
1. Morton International, Inc.
 2. Pecora Corporation: www.pecora.com.
 3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
- D. Acrylic Sealants:
1. Tremco, Inc: www.tremcosealants.com.
- E. Butyl Sealants:
1. Bostik: www.bostik.com.
 2. Pecora Corporation: www.pecora.com.
 3. Tremco, Inc: www.tremcosealants.com.
- F. Acrylic Emulsion Latex Sealants:
1. Bostik: www.bostik.com.
 2. Pecora Corporation: www.pecora.com.
 3. Sonneborn Building Products, ChemRex, Inc: www.chemrex.com.
 4. Tremco, Inc: www.tremcosealants.com.
- G. Preformed Compressible Foam Sealers:
1. Emseal Joint Systems, Ltd: www.emseal.com.
 2. Sandell Manufacturing Company, Inc: www.sandellmfg.com.
 3. Polytite Manufacturing Corporation: www.polytite.com.

2.02 SEALANTS

- A. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component.
1. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.

- d. Other exterior joints for which no other sealant is indicated.
- B. Exterior Expansion Joint Sealer: ASTM D 2628, hollow neoprene (polychloroprene) compression gasket.
 - 1. Black color.
 - 2. Size and Shape: As indicated on Drawings.
 - 3. Applications: Use for:
 - a. Exterior wall expansion joints.
 - b. Parking deck expansion joints.
- C. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, I, M and A; single component.
 - 1. Color: Gray.
 - 2. Applications: Use for:
 - a. Joints in sidewalks and vehicular paving.
 - 3. Hot tar is not allowed

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter which might impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C 1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C 1193.
- C. Perform acoustical sealant application work in accordance with ASTM C 919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker where joint backing is not used.

- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- G. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- H. Tool joints concave.
- I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.

END OF SECTION

**SECTION 32 84 00
UNDERGROUND SPRINKLER SYSTEM**

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 this section.
 - 1. See Section 00 73 00 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY

- A. Scope of Work: Furnish and install the complete underground irrigation system specified herein, including all labor, materials, equipment, apparatus, and services for the testing, adjusting, retesting and readjusting as required to place the system in an approved operating condition.
- B. Arrange for, obtain, and pay for all necessary permits, bonds, and fees.
- C. Excavating and backfill and compaction for all work as specified and are to include all machinery and labor.
- D. To complete underground irrigation system from the point of connection, throughout the site, including piping, fittings, valves, drains, sprinkler fittings, sprinkler heads, automatic controller(s) and any other necessary appurtenances.
- E. Complete irrigation system for all areas as shown on the drawings.
- F. To furnish and install all piping, fittings, valves, valve boxes, valve covers, electric valve wiring and appurtenances.
- G. To furnish and install all automatic control devices and connect controller to electric service.
- H. To test the entire piping and wiring systems.
- I. To furnish and install sprinkler heads.
- J. To regulate and adjust all sprinkler heads, timed sequence control devices, sectional valves, rain override, etc.
- K. To furnish a qualified, sprinkler system technician to instruct the Owner's operating personnel in the maintenance and operation of the irrigation system.

1.3 PERFORMANCE REQUIREMENTS

- A. Irrigation zone control shall be automatic operation with controller and automatic control valves.
- B. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
 - 1. Irrigation Main Piping: 200 psi
 - 2. Circuit Piping: 150 psi
- C. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustment necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.
- B. Wiring Diagrams: For power, signal, and control wiring.
- C. Qualification Data: For qualified Installer.
- D. Zoning Chart: Show each irrigation zone and its control valve.
- E. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
- F. Field quality-control reports.
 - 1. Pressure Test Results
- G. Operation and Maintenance Data: For sprinklers controllers and automatic control valves to include in operation and maintenance manuals.
- H. Field Record Drawings
 - 1. Upon completion of the irrigation system, a complete "record drawing" will be submitted to the Owner or his agent. This drawing shall indicate thereon all pipe sizes, valve locations, dimensional data from building walls or column center lines, to the piping and valves, sprinkler heads, etc. Accompanying the record drawings shall be instruction sheets and parts lists, covering all operating equipment, bound into a folder.
- I. Copy of Contractors Certificate for CIC.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers that include a Certified Irrigation Contractor (CIC)
- 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

2. PRODUCTS

2.1 COPPER PIPING

- A. Copper piping shall be Type K, hard copper, and will be used on all exposed pipe.
- B. Copper pipe fittings shall be wrought solder-type cast solder-joint fittings.

2.2 PVC PIPE

- A. All PVC pipe shall be virgin, high impact, polyvinyl chloride having a minimum working pressure rating of Class 200 or Schedule 40. All PVC pipe shall be continuously and permanently marked with manufacturer's name, material, size, and schedule of type. Pipe shall conform to US. Department of Commerce Commercial Standard CS 207-60, or latest revision. Material shall conform to all requirements of PVC 1120, ASTM D-1785, or latest revision.
- B. Priming and solvent welding shall cause complete leakproof plasticized joint upon evaporation. Solvent shall conform to U.S. Government Specification No. GS-256.63.

2.3 POLYETHYLENE PIPE (For Shrub Bed Drip Tubing Only)

- A. ASTM 2239 flexible polyethylene pipe rated at 100 psi minimum working pressure.

2.4 SPRINKLER RISER

- A. Standard PVC nipple.

2.5 GATE VALVES & DRAIN VALVE

- A. Manufacturer's standard of type and size required bass construction conforming to A.W.W.A. Specifications.

2.6 BOXES FOR AUTOMATIC CONTROL VALVES

- A. Plastic Boxes
 - 1. Manufacturer's standard of type and size required.
 - a. Armorcast Products Company
 - b. Carson Industries, LLC
 - c. Nationwide Plastics, Inc

- d. NewBasis
 - e. Oldcastle, Inc
 - f. Orbit Irrigation Products
2. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade
- a. Size and Shape: As required for valves and services

2.7 AUTOMATIC IRRIGATION CONTROLLER

A. Manufactures: Subject to compliance with requirements

- 1. Hunter
 - a. Model: As noted on drawings
- 2. Or equal, if and as specifically approved by Landscape Architect by Addendum during bidding period.

B. Wiring: The controller to be installed and wired in accordance with the manufacturer's published instructions.

- 1. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers
- 2. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; colors-coded different from feeder-circuit-cable jacket color, with jacket of different colors for multiple-cable installation in same trench.
 - a. Electric control wires from each controller to the automatic valves shall be direct burial UF wire of a different color than the black and white wires used on the 115 volt A.C. power. Ground wire shall be a different color than the control lines. A ground wire shall be required for each controller.
 - b. Provide 12" expansion coil at each valve and at 100 ft intervals.
- 3. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

C. Construction: Controller shall be enclosed in a housing having a hinged cover with provision for locking. Controller shall be completely electric in operation and shall not employ hydraulic tubing, or otherwise introduce into the controller water or other fluids subject to freezing or leakage.

D. Location of controller is indicated on drawings.

2.8 SHRUB AND LAWN SPRINKLER HEADS

A. Manufacture:

- 1. Hunter Industries
 - a. Model: As noted on drawings

2. Or equal, if and as specifically approved by Landscape Architect by Addendum during bidding period.

B. All full and part circle sprinkler bodies and nozzles. These sprinklers shall be of the pop-up type, gear or rotary drive type. Spacing of the heads shall not exceed the manufacturer's maximum recommendations.

C. Matched precipitation will be required on all full and part circle sprinklers on the same zone.

2.9 AUTOMATIC VALVES

A. Manufacture:

1. Hunter Industries

a. Model: As noted on drawings

2. Or equal, if and as specifically approved by Landscape Architect by Addendum during bidding period.

B. Remote control valves shall be as indicated on the drawing. Valve shall be solenoid operated, diaphragm, globe-type having IPS threads and suitable for underground burial without protection.

C. Construction: Valve shall be packless, without sliding seals, and completely serviceable without removing body from pipeline. Design shall be normally closed requiring solenoid to be energized to open valve, thereby causing automatic closure in event of power failure. Solenoid shall comply with Class 2 National Electric Code and when operating require a maximum of 3.0 watts at 24 volts AC. Solenoid shall be coated in epoxy to form a corrosion and moisture proof unit with exposed metal components of non-corrosive material.

D. Operation: Solenoid shall be energized to open the valve hydraulically and de-energized to close. Pressure to the hydraulic chamber shall be supplied internally through a nonmetallic, corrosion-free orifice in the diaphragm. There shall be no external bleeding or external tubing to furnish actuating pressure. Valve shall operate in any position without water hammer at normal flow velocities. A manual bleed lever shall be included.

2.10 RAIN SHUT-OFF

A. A rain sensing device shall be installed which will override the automatic setting in the event of rain. The device shall be mounted in a location unobstructed by walls, trees, or other hindrances, and shall be located so as not to be vandalized. Contractor shall verify the location and routing or control wires with Architect prior to installation.

2.11 QUICK COUPLING VALVES

A. Manufacture:

1. Hunter

- a. Model: As noted on drawings
- 2. Or equal, if and as specifically approved by Landscape Architect by Addendum during bidding period.
- B. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.NH threads for garden hose on outlet; and operating key
 - 1. Locking-Top: Vandal-resistant locking feature, Include (2) two matching keys.
- C. Quick coupling valves shall be installed where in a 4 inch dia. vault with cover.
 - 1. Fill: Clean soil free of stones larger than 2" diameter, foreign matter, organic matter and debris. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials. Suitable excavated materials removed to accommodate the irrigation system work may be used as fill.
 - a. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3" maximum to 3/4" minimum.
- D. Thrust Blocks: 3,000 psi concrete.

3. EXECUTION

3.1 SYSTEM DESIGN

- A. Inspection: Examine existing elevations and conditions at site. Do not begin system design until all existing conditions are satisfactorily understood.
- B. Design Pressures: Contractor to verify static water pressure available at connection to water supply. Actual working pressure in an individual circuit shall fall between manufacturer's recommended minimum and maximum operating pressures for the last sprinkler head in the circuit.
- C. Design Velocities: Velocity of water in sprinkler system should not exceed 5-6 fps.
- D. Location of Sprinkler Heads: Begin sprinkler head location at areas to be bordered (buildings, etc.). Fill in with sprinklers in the middle areas. Design for 100% radius overlap coverage. Locate sprinkler heads based on triangular spacing wherever possible. Locate sprinkler heads so that trees are approximately halfway between heads wherever possible. Do not spray buildings, or deck areas. Do not spray sidewalks.
- E. Sectioning of Irrigation System: Individual circuits shall be designed so that total GPM required per circuit does not exceed available GPM. System shall be designed so that areas irrigated by individual circuits exhibit compatible conditions, including soil type, plant material type and sun exposure. System shall be designed so that sprinkler head types and precipitation rates of sprinklers are compatible on same circuit. Design system so that circuits furthest from supply require lowest total GPM. Design system so that each section includes one quick coupling valve.

F. Piping: Avoid following piping layout situations:

1. Avoid piping layout along sides of structures.
2. Avoid odd angles in piping layout.
3. Avoid unbalanced friction losses.
4. Avoid high friction losses.
5. Avoid excessive trenching.

3.2 EXCAVATING AND BACKFILLING

- A. An excavation shall be considered unclassified excavation and include all materials encountered.
- B. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings.
- C. If the pulling method is used, the pipe "plow" shall be a vibratory type. Starting and finishing holes for pipe pulling shall not exceed a 1'-0" by 3'-0" opening.
- D. Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.
- E. Fill to match adjacent grade elevations with approved earth fill materials. Place and compact fill in layers not greater than 6" depth. Provide approved earth fill or sand to a point 4" above the top of pipe. Fill to within 6" of final grade with approved excavated or borrow fill materials free of lumps or rocks larger than 2" in any dimension. Provide clean topsoil free of rocks and debris for top 6" of fill. **Install irrigation lines with a minimum cover of 24" for main lines. 12" for laterals based on existing finished grades.**
- F. Excavate trenches and install piping and fill during the same working day. Do not leave trenches or partially filled trenches open overnight.
- G. Promptly notify the Architect of unexpected sub-surface conditions.

3.3 INSTALLATION

- A. Unless otherwise indicated, comply with requirements of Uniform Plumbing Code.
- B. Point of Connection: Point of connection is as shown on the drawings.
- C. Circuit Valves: Install in accordance to manufacturer's instructions. Install in valve box, arranged for easy adjustment and removal. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box. Provide union on downstream side. Seal threaded connections on pressure side of control valves with teflon tape or plastic joint type compound. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

- D. Plastic Pipe: Install plastic pipe in dry weather when temperature is above 40 degrees F. in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction. Lay pipe on solid subbase, uniformly sloped without humps or depressions. For circuit piping, slope to drain valve at least 1/2" in 10' of lawn.
- E. Saw Cut Plastic Pipe: Use a square-in-sawing vice to insure a square cut. Remove burs and shavings at cut ends prior to installation.
- F. Make plastic to plastic joints in solvent weld joints or slip seal joints. Use only solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions. Owner shall make arrangements with pipe manufacturer for all necessary field assistance. Make plastic to metal joints with plastic male adapters. Make solvent weld joints in accordance with manufacturer's recommendations. Allow joints to set at least 24 hours at temperature above 40 degrees F. before pressure is applied to the system.
- G. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.
- H. Install thrust blocks on distribution lines at locations that make an abrupt change of direction.
- I. Piping shall be located at the approximate location shown on the drawings.
- J. The pipe shall be installed and maintained at the proper lines and grades with joints centered and with fittings and other appurtenances at the required locations.
- K. All risers to heads shall be constructed of nipples or elbows to permit height adjustment of head. Install heads two inches back of any hard surface.
- L. All plantings and landscape material damaged or destroyed in the installation operation shall be replaced with planting materials, equal in type, size, age, and condition at the contractor's expense.
- M. The installation of all pipes shall be done by irrigation installers skilled in this work and under adequate and competent work supervision.

3.4 SPRINKLER HEADS

- A. Flush circuit lines with full head of water and install heads after hydrostatic test is completed. Install fittings, heads, risers and accessories in accordance with manufacturer's instructions. Set sprinkler heads perpendicular to finished grades at manufacturer's recommended heights.
- B. Install quick coupling valves with an adjustable double swing joint riser assembled by the use of at least 3 standard 90 degree elbows. Fabricate double swing joint risers of Schedule 80 PVC nipples and Schedule 40 PVC elbows.

3.5 CONTROL WIRING

- A. Install electric control cable in the piping trenches wherever possible. Place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Expansion joints in wire may be provided at 100 foot intervals by making 5 or 6 turns of the wire around a piece of 1/2" pipe instead of slack. Where necessary to run wire in a separate trench, provide a minimum cover of 12".
- B. Provide sufficient slack at site connections at remote control valves in control boxes and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.
- C. Connect each remote-control valve to one station of a controller except as otherwise indicated. Connect remote control valves to a common ground wire system independent of all other controllers. Make wire connections to remote control electric valves and splices of wire in the field, using wire connectors and sealing cement in accordance with manufacturer's recommendations.
- D. Provide tight joints to prevent leakage of water and corrosion build up on the joint.

3.6 FLUSHING, TESTING AND ADJUSTMENT

- A. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with fill head of water. **Pressure test all lines before joint areas are backfilled.** Backfill a portion of the trench area to maintain pipe stability during test period. All mainline piping shall be tested at a hydraulic pressure of 100 PSI Upon visual inspection of each joint and the ground, any leak detected shall be repaired. The line shall be re-tested until the necessary repairs made to put the system in good working order. After testing, the system shall be flushed with a minimum of 150% of the operation flow passing through each pipe, beginning with the larger mains and continuing through the smaller mains in sequence.
- B. Perform system testing upon completion of each section. Make necessary repairs and retest repaired sections as required.
- C. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.
- D. Tighten nozzles on spray type sprinklers after installation. Adjust sprinkler adjusting screw on lateral line or circuit as required for proper radius. Interchange nozzles patterns to give best arc of coverage.
- E. Adjust all electric remote control valve pressure regulators and flow control stems for system balance and optimum performance.
- F. Test and demonstrate the controller by operating appropriate day, hour and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.

3.7 CLEANUP AND PROTECTION

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.
- B. Protect irrigation system and materials from damage due to performance of work, operations by other contractors, trades and trespassers. Maintain protection during installation and testing periods.
- C. The entire area shall be left clean and neat.
- D. The contractor shall be responsible for all damage caused by his operations to trees, shrubs, curbs, paving, structures, utilities, etc., on the site or adjacent to the site of the work and shall repair, replace or otherwise make good any damage caused by him.
- E. The contractor is to coordinate this work with other trades.
- F. The contractor shall check the system two weeks after acceptance and four weeks after acceptance. The Contractor shall drain the system in the Fall following installation, turn it on and completely checking it in the Spring following installation.

3.8 GUARANTEE

- A. The entire sprinkler system will be unconditionally guaranteed against defects in material and workmanship, including settling of backfilled areas below grade and adjusting heads to proper level for a period of one year from the date of acceptance.
- B. In addition to minor adjustments, any defective electrical controls, valves, sprinkler heads or other working parts will be repaired or replaced without cost to the Owner for a period of one year from the date of acceptance.
- C. Damage by others during, the one-year guarantee period will be the Owner's responsibility.

END OF SECTION

SECTION 32 92 00
TURF AND GRASSES

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 this section.
 - 1. See Section 00 73 00 "Supplementary Conditions", if included, for requirements relating to interpretation of the drawings and specifications.

1.2 SUMMARY OF WORK

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Turf and Grasses as indicated on the plans and as herein specified.
- B. This section includes the following:
 - 1. Seeding
 - 2. Sodding
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 31 Section "Erosion and Sediment Control Systems" for erosion control materials
 - 2. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling
 - 3. Division 31 Section for excavation, filling and backfilling, and rough grading
 - 4. Division 32 Section "Planting Irrigation" for turf irrigation
 - 5. Division 32 Section "Plant Material" for border edgings

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. Pesticides and Herbicides: Include product label and manufacturer's application instruction specific to this project.
- B. Certification of Grass Seed: From seed vender 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. Included year of production and date of packaging.
 - 1. Certification of each seed mixture for turf grass sod and seed. Include identification of source, name and telephone number of supplier.

- C. **Seed Supplier to furnish tags that list job name, mix type and bag weight. Tags are to be attached to each bag by supplier. Bags are to be delivered to site with tags attached. As bags are used, tags shall be removed from each bag and collected by contractor. Contractor to turn over all used tags to Engineer**
- D. Qualification Data: For qualified landscape Installer.
- E. Material Test Reports: For existing native surface topsoil, existing in-place surface soil and imported or manufactured topsoil.
- F. Product Certificates: For fertilizers from manufacturer.

1.4 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 (5) years' experience in turf installation
 - 3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project Site when work is in progress
 - 4. Pesticide Applicator: State licensed, commercial.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened container showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Seed Supplier to furnish tags that list job name, mix type and bag weight. Tags are to be attached to each bag by supplier. Bags are to be delivered to site with tags attached. As bags are used, tags shall be removed from each bag and collected by contractor. Contractor to turn over all used tags to Engineer
- C. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver Sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.
- D. 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 or soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery or bulk fertilizer and soil amendments with appropriate certificates.

1.6 PROJECT CONDITIONS

- A. Proceed with and complete seeding work as rapidly as portions of site become available, working within seasonal limitations.
- B. Protect existing utilities, paving, plant material, and other facilities from damage caused by seeding operations.
- C. Perform seeding work only after planting and other work affecting ground surface has been completed.
- D. Restrict pedestrian, bicycle, vehicular and other traffic from lawn areas until grass is established. Erect signs and barriers as required.
- E. Provide hose and lawn watering equipment as required.
- F. Planting Restrictions: Plant during on of the following periods.
 - 1. Cool Season Grass Seeding
 - a. Spring Planting: March 15 – April 15
 - b. Fall Planting: August 15- September 21 (preferred)
 - c. Dormant Planting: November 30- March 1
 - 2. Warm Season Grasses and Wildflower Seeding
 - a. Spring Planting: April 15 - June 1 (preferred)
 - b. Summer Planting June 15-Aug 15
 - c. Dormant Planting: November 30- March 1
 - 3. Cool Season Grass Sodding
 - a. Anytime soils are not frozen. Sodding in early spring and early fall are preferred. Sodding in late fall and winter is acceptable as long as irrigation is available throughout the winter to establish and minimize winter desiccation on exposed sites.
 - 4. Weather Limitations: The actual planting shall be performed during those times in this season which are normal for such work as determined by weather conditions and accepted practice in the locality. No work shall be performed when the ground is frozen, wet, or otherwise un-tillable or when even distribution of materials cannot be obtained.

1.7 TURF AND GRASS ESTABLISHMENT

- A. The contractor will be responsible for turf and grass establishment as outlined in paragraph 3.

1.8 MAINTENANCE SERVICE

- A. The **Contractor** will provide full maintenance (mowing, watering and weeding) post acceptance of established turf as defined by paragraph 3.7 Satisfactory Turf for a period of 90 days and a minimum of 4 mowing's.

2. PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry and new crop complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances. Provide seed mixture composed of grass species, proportions and minimum percentages of purity and germination. Noxious weed seed free.
- B. Seed Mixture types: As noted on drawings.

2.2 TURFGRASS SOD

- A. Turfgrass Sod: 'Certified' or 'Approved', complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding" and as noted below. Furnish viable sod of uniform density, color and texture, strongly rooted, and capable of vigorous growth and development when planted.
 - 1. Certified Turfgrass Sod: Certified turfgrass sod is superior sod grown from certified, high-quality seed of known origin or from plantings of certified grass sprigs or stolons. It is inspected by the certification agency of the area to assure satisfactory varietal identity and purity, overall high quality and freedom from noxious weeds or excessive amounts of other crop and weedy plants at time of harvest. It may be of either one variety or composed of a mixture of two or more varieties or species. However, all seed in a mixture must be certified. The turfgrass sod must meet the area's published standards for certification.
 - 2. Approved Turfgrass Sod: Approved turfgrass sod is superior sod, grown from approved seed of known origin or from plantings of approved grass sprigs or stolons. Field standards for approved sod are similar to those of certified sod. It is inspected by the official certification agency of the area to assure overall high quality and freedom from noxious weeds or excessive amounts of other crop and weedy plants at time of harvest. It may be either one variety or composed of a mixture of two or more varieties of species. However, all seed in a mixture must be approved.
- B. Sod Mixture types: As noted on drawings.

2.3 FLOODPLAIN / WETLAND GRASSES

- A. Seed: Fresh, Clean, and dry new seed, of mixed species as indicated on drawings
- B. Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.
- C. Seed Mixture types: As noted on drawings.

2.4 FERTILIZERS

- A. Starter Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 15-25 percent nitrogen, 20-25 percent phosphorous, and 5-10 percent potassium, by weight.
2. Application: Apply at rate of 1.0-1.5 lb. P₂O₂/1000 sf depending on recommendations of soil reports from a qualified soil-testing laboratory.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight
2. Application: Apply at rated recommended in soil report from a qualified soil-testing laboratory.

2.5 MULCHES

A. Hay or Straw Mulch: Provide air-dry, clean, mildew free, noxious weed seed free, native prairie hay, native grass hay, threshed oats, wheat, or rye.

2.6 PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.7 WATER

A. Water: Free of substance harmful to seed growth. Hoses or other methods of transportation furnished by Contractor.

3. EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 1. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AND GRASSES AREA PREPARATION

- A. Limit turf and grasses subgrade preparation to areas to be seeded or sodded.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of **6 inches**. Remove stones larger than 1-inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 2. Loosen surface soil to a depth of at least **6 inches**. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil.
 3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Sod areas are to be held down **1/2" below finished grade** when adjacent to pavement or seeded areas to created flush transition. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

- A. Sow seed with acceptable seeding equipment. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Seed drills, hydraulic seeders, and gravity broadcast seeders may be used as acceptable seeding equipment for planting seed. The contract may indicate the type of seeding equipment to be used on the project.
 - a. Seed Drills: Seed drills shall be equipped with press wheels or drag chains. The seed delivery system shall space rows no greater than 8 inches apart, shall include a seed box agitation system, and shall be capable of metering seed at the rate specified in the contract. Seed shall not be planted greater than 1/2 inch deep.
 - b. Hydraulic Seeders: Use hydraulic seeding equipment with a pump rated at no less than 100 gallons (350 L) per minute. The equipment shall have suitable working pressure and a nozzle adapted for hydraulic seeding. The supply and/or storage tanks shall have a means of mechanical agitation. The tanks shall be calibrated, and have a means of measuring the volume used or remaining in the tank. When using a hydraulic seeder, the fertilizer shall be applied separately from the seed.
 - c. Gravity Broadcast Seeders: In areas inaccessible to field machinery, implement mounted or handheld broadcast seeders may be permitted at the discretion of the Engineer. Gravity broadcast seeders shall provide agitation of the seed, have a functioning adjustable gate opening, and uniformly distribute seed on the seedbed. Implement mounted broadcast seeders shall be equipped with seed hopper baffle plates. Implement mounted broadcast seeders shall be equipped with a shielded front to prevent the spreading of material in front of the spreader.
 - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate as noted on drawings
- C. Sow seed to a soil depth as recommended by supplier.
- D. Protect seeded areas with slopes where indicated by drawings or specifications; installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with erosion-control mats where indicated by drawings or specifications; install and anchor according to manufacturer's written instructions.
- F. Protect all other seeded areas not indicated to receive erosion control matting or blankets by spreading straw or hay mulch.
 - 1. Hay shall be either dry cured native prairie hay, native grass hay from seed growing operations, native grass hay from planted warm season grass stands
 - a. Brome hay is not allowed

- b. The mulch shall be certified as "Noxious Weed Free" by the "County Weed Control Authority" or other authorized agents
 - c. Hay shall be applied at the rate of 2 tons/acre
- 2. Straw shall be from threshed oats, wheat, or rye. Rye straw shall not be used in any wheat growing area. The straw shall be baled before the seasonal growth of annual weeds.
 - a. Straw shall be applied at the rate of 2.25 tons/acre
- 3. Hay or straw in a stage of decomposition so advanced as to "powder" in the mulch blower shall be rejected.
- 4. The mulch shall be applied loose enough to allow sunlight to penetrate and air to slowly circulate, but thick enough to partially shade the ground, reduce water evaporation, and reduce wind and water erosion.
- 5. Immediately after applying the mulch, the Contractor shall anchor it to the soil using a mulch crimper with approximately 6-inch cleats or other approved equipment with perpendicular, dull, disc blades.
 - a. All mulch shall be crimped the same day it is applied.
 - b. The crimper shall be narrow enough or hinged to uniformly crimp the mulch into the sloped and swale areas. More than one crimping may be necessary in these areas if directed by the Landscape Architect.

3.5 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 - 1. Lay sod across angle of slopes exceeding 1:3.
 - 2. Anchor sod on slopes exceeding 1:4 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.6 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

- B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.7 TURF ESTABLISHMENT

- A. Establish turf by fertilizing, weeding, watering, replanting, and performing other operations as required to establish healthy, viable turf as defined by **Satisfactory Turf and Grass**. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.
 - 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 2 inch per week unless rainfall precipitation is adequate.
- C. Mow manicured turf grasses as soon as top growth is tall enough to cut. Repeat mowing to maintain a min 2.5 inch to 3 inch height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height: 3"

3.8 SATISFACTORY TURF AND GRASS

- A. **Turf installation and establishment shall meet the following criteria. Landscape Architect / Owner to review for acceptance prior to turnover for Supplemental Maintenance Service.**
 - 1. Satisfactory Seeded Turf: At end of establishment period, a healthy, uniform, close stand of grass has been established, 90 percent weed free, and without surface grade irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 6 by 6 inches. Minimum of 2" in height.
 - 2. Satisfactory Sodded Turf: At end of establishment period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
 - 3. Satisfactory Seeded Warm Season Grass / Wildflowers: A healthy, uniform, stand of grass has been establishes and without surface grade irregularities, with coverage exceeding 60 percent over any 10 sq. ft. and bare spots not exceeding 12 by 12 inches. Minimum of 2" in height.

- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

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. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period and site has been stabilized.

END OF SECTION

**SECTION 32 93 00
FURNISHING AND PLANTING OF PLANT MATERIALS**

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 this Section.

1.2 SUMMARY OF WORK

- A. Work shall include all labor, materials, and equipment necessary to completely furnish and install the Plant Materials as indicated on the plans and as herein specified.

- B. The section includes the following:

1. Plant Materials as indicated on drawings

- C. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 31 Section for excavation, filling, and grading.
2. Division 31 Section "Erosion and Sediment Control Systems" for erosion control materials
3. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling
4. Division 32 Section "Underground Irrigation System"
5. Division 32 Section "Turf and Grasses".

- D. Nomenclature used conforms to the standard nomenclature as published in Hortus III, 1976. Names of varieties not listed conform generally with names accepted by the nursery trade.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated

1. Plant Materials: Include quantities, sizes, quality, and sources for plant material
 - a. List of Sources: Submit a written list of the nurseries where the plant material was grown. Plant materials from unapproved sources will be rejected.
2. Pesticides and Herbicides: Include product label and manufacturer's application instruction specific to the Project

- B. Samples for Verification: For each of the following

1. Trees and Shrubs: Samples of each variety and size delivered to the site for review
2. Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Sample shall be

- typical of the lot of material to be delivered and installed on the site; provide an accurate indication of color, texture and organic makeup.
3. Topsoil:
 - a. Material Test Reports: For existing native surface topsoil, existing in-place surface soil and imported topsoil.
 - b. Sample: 1-pint volume for imported topsoil.
 - C. Qualification Data: For qualified landscape installer. Included list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, address, and year completed, and include name and addresses of owners' contact persons.
 1. Provide copy of Professional Landcare Network or the American Nursery and Landscape Association membership.
 - D. Certificate of Inspection: Submit certificates of inspection as required by governmental authorities.
 - E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
 - F. Maintenance Inspection Reports: Provide dates and location of plant material replaced during the special project warranty.

1.4 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 or either the Professional Landcare Network or the American Nursery and Landscape Association
 2. Experience: 5 years' minimum experience in landscape installation.
 3. Installer's Field Supervision: Require Installer to maintain an experienced full-term supervisor on Project site when work is in progress
 4. Pesticide Applicator: State licensed, commercial
- B. Plant Material Observation: Landscape 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 retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site
 1. Notify Landscape Architect or sources of planting materials 7 days in advance of delivery to site
- C. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

- D. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 - 1. Deciduous 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 trees.
 - 2. Evergreen Trees: Height measurement shall not be taken at the tip of the leader, but should be taken at the midpoint between the uppermost whorl(s) and the tip of the leader.
 - 3. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- E. Preinstallation Conference: Conduct conference at Project Site with Owner and Landscape Architect.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored at site. All plants shall be packed in such a manner as to assure proper protection against freezing, drying, breaking, overheating or other injury. Use accepted practices to insure arrival in good condition.
- B. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements including pervious pavement, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge or soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers and soil amendments 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. Deliver trees and shrubs after preparations for planting have been completed. Plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
 - 1. Set balled stock on ground and cover ball with soil, peat moss or other acceptable material.
 - 2. Do not remove container-grown stock from container 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.

1.6 PROJECT CONDITIONS

- A. Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.
- B. Planting Restrictions: Plant materials only during normal planting seasons for each type of landscape work required, except when prior written permission is obtained from the Landscape Architect. Actual planting time shall be as determined by weather conditions and accepted local practice. The planting seasons shall be:
 - 1. Fall Planting Season:
 - a. August 15 to September 15 for all coniferous materials
 - b. October 15 to November 15 for all deciduous materials
 - c. September 1 to October 1 for all perennials
 - 2. Spring Planting Season:
 - a. March 15 to May 1 for all coniferous materials
 - b. March 1 to May 15 for all deciduous materials
 - c. April 15 to May 31 for all perennials
- C. Coordination with Lawns and Irrigation Systems: Planting of plant materials shall be after establishment of final grades and prior to planting of lawns and installation of irrigation system, unless otherwise acceptable to Architect.
 - 1. If planting of plant materials occurs after lawn work, protect lawn areas and irrigation system and promptly repair damage resulting from planting operations.

1.7 SPECIAL PROJECT WARRANTY

- A. The Contractor shall provide replacement plants for all plant materials which die during the 1-year of establishment following the completion and acceptance of all plantings.
 - 1. Failures include, but are not limited to, the following:
 - a. Death or unsatisfactory growth, except for defects resulting from abuse, or material damaged by vandalism or unusual phenomena or incidents beyond the Landscape Installer's control will not be replaced as part of this contract.
 - b. Structural failures including plantings falling from blowing over
 - c. Faulty performance of tree stabilization
 - 2. 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. Provide extended warranty for period equal to original warranty period, for replaced plant material.

- B. Establishment Period: The Establishment Period will not begin until all of the following items of work have been performed. All plant material shall be planted and in acceptable growing condition when the project enters the establishment period. Establishment Period shall not begin until the Landscape Architect as inspected and accepted the plant material.
 - 1. Notify Architect for inspection and acceptance.
 - 2. Planting
 - 3. Backfilling
 - 4. Watering
 - 5. Pruning
 - 6. Wrapping
 - 7. Staking
 - 8. Guying
 - 9. Mulching

- C. Completion of the Establishment Period: Landscape Architect will make an inspection of the plant material for acceptability. The Contractor will be notified in writing of the quantities of the plant material that shall be replaced in the next planting season.
 - 1. Replacement plants shall be at the Contractor's expense. Plant material damaged by vandalism or unusual phenomena or incidents beyond the Landscape Installer's control will not be replaced as part of this contract.

- D. The Contractor's responsibility for all spring replacement plants shall extend for 60 days after such time as the last plant to be replaced is properly planted and accepted by the Landscape Architect. The Contractor's responsibility for all fall replacement plants shall extend until June 1 of the following year.

1.8 MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees, Shrubs, Groundcovers and all other plants: Provide maintenance by skilled employees and landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below
 - 1. Maintenance Period: 1 year from date of substantial completion or through the Establishment Period outlined above, whichever is greater.

PART 2 - PRODUCTS

1.1 PLANT MATERIALS

- A. Provide trees, shrubs, and other plants of size, genus, species, and variety shown and scheduled. Comply with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock," latest edition.

- B. Provide plant materials grown under climatic conditions similar to conditions in Lincoln, Nebraska (USDA Zone 5, Arnold Arboretum Zone 4) for a minimum of two years.
- C. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system. Provide ball sizes complying with the latest edition of ANSI Z60.1 "American Standard for Nursery Stock." Cracked or mushroomed balls are not acceptable.
- D. Furnish minimum size indicated. Larger stock is acceptable provided stocks will not be cut back to size indicated. Enlarge root ball in proportion to the size of the plant.
- E. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.
- F. Deciduous Trees: Provide balled and burlapped (B & B) or spaded trees of height and caliper as indicated with branching configuration recommended by ANSI Z60.1 for type and species required. Unless otherwise indicated, provide single stem trees.
- G. Deciduous Shrubs: Provide balled and burlapped or container grown shrubs of the height indicated and with not less than minimum number of canes required by ANSI Z60.1 for type and height of shrub required. Thin plants will not be accepted. Side branches shall be generous, well-twigged, and the plant as a whole well-bushed to the ground. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other injuries.
- H. Coniferous Evergreens: Provide balled and burlapped (B & B) evergreens of sizes indicated. Dimensions indicate minimum spread and height. Provide normal quality evergreens with well-balanced form, branched to the ground. Shearing evergreens will be cause for rejection.
- I. Perennials: Provide container grown perennials which exhibit well-developed root systems and healthy, well-developed crowns.

1.2 MISCELLANEOUS PLANTING MATERIALS

- A. Topsoil for Shrub Planting Areas: Fertile, friable, natural loam, dark in color (often black), free of subsoil, clay lumps, brush, weeds, roots, stumps, stones larger than 1-1/2" in any dimensions, debris, and other extraneous or toxic matter and harmful to plant growth. Topsoil shall be obtained from local sources and exhibit an acidity range (pH) of 7.0 to 8.0. Identify location of source.
- B. Mulch for Trees, Shrubs and Perennials: Organic mulch, free from wood chips, sawdust and deleterious materials, suitable for top dressing of trees. Mulch shall consist of six-month-old, well-rotted, shredded native hardwood bark mulch not larger than 3" in length and 1/2" in width.
- C. Fertilizer: Provide commercial type fertilizer of neutral character approved by Architect, containing 12% nitrogen, 4% phosphoric acid and 8% potash by weight. Application rates shall be as follows:
 1. For 2 1/2" Caliper Trees: 1-1/4 pound per plant
 2. For 1 1/2" Caliper Trees: 3/4 pound per plant
 3. For 6' B&B Trees: 1/2 pound per plant
 4. For No. 5 Container shrubs: 1/3 pound per plant

5. For No. 3 Container shrubs: 1/6 pound per plant
- D. Anti-Desiccant: Emulsion type, film-forming agent designed to permit transpiration but retard excessive loss of moisture from plants. Deliver in manufacturer's fully identified containers and mix in accordance with manufacturer's instructions.
- E. Plant Starter: Liquid solution with an analysis of 3-10-3 (low analysis fertilizer), such as Upstart manufactured by Ortho, or approved equal. Guaranteed analysis shall be as follows:
- | | |
|--|--------|
| 1. Total Nitrogen (N) | 3.00% |
| 2. Ammoniacal Nitrogen | 2.10% |
| 3. Nitrate Nitrogen | 0.90% |
| 4. Available Phosphoric Acid (P ₂ O ₅) | 10.00% |
| 5. Soluble Potash (K ₂ O) | 3.00% |
| 6. Nutrients from Ammonium Phosphate and Nitrate of Potash Chloride
Not more than | 0.10% |
| 7. Thiamine Hydrochloride (Vitamin B-1) | 0.01% |
- F. Wrapping: Tree wrap shall be designed to prevent bore damage and winter freezing and shall consist of two sheets of crinkled, waterproof paper, cemented together with asphalt, and weighing not less than 4 pounds per 100 square feet. Tree-wrap tape shall be not less than 4" wide.
- G. Twine: Two-ply jute material.
- H. Water: Free of substances harmful to plant growth. Hoses shall be furnished by Contractor.
- I. Stakes: Stakes shall be hardwood 2" x 2" by height indicated.
- J. Guying Hose: Two-ply, reinforced garden hose not less than 1/2" inside diameter.
- K. Guying Wire: 12 gauge galvanized double-twisted wire.
- L. Edging: A cultivated mulch edge as detailed on the drawings.

PART 3 - EXECUTION

2.1 PREPARATION

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.
- B. Layout individual tree and shrub locations. Stake locations and secure Landscape Architect's acceptance before start of planting work. Make minor adjustments as may be requested.
- C. Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required.
- D. Excavate pits, beds and trenches with vertical sides and with bottom slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation and scarify sides.

1. For balled and burlapped trees and shrubs, scarify bottom of the excavations to a depth of 4". Make excavations equal to the depth of ball, and diameter at least 12" greater than ball for shrubs and 24" trees.

E. When conditions detrimental to plant growth are encountered, such as rubble fill or adverse drainage conditions, notify Landscape Architect. Hand excavate near underground utilities. Maintain grade stakes set by others until removal is agreed upon by all parties concerned.

F. Break up existing soil in all planting beds to a depth of 24 inches. Remove top 12 inches and place new topsoil in all planting beds to a depth of 12 inches prior to planting.

2.2 PLANTING TREES AND SHRUBS

A. Planting shall be performed only by experienced persons familiar with planting procedures under the supervision of a qualified supervisor.

B. Set balled and burlapped stock plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Rotate plants to give the best appearance and relationship to each other or adjacent structures.

C. For all plants other than evergreens, remove burlap from sides of balls but retain burlap on bottoms. Where wire basket used, cut and remove wire basket without disturbing plant roots. Completely remove containers for container grown stock.

D. Place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Apply plant starter at manufacturer's suggested rates during watering process. Water again after placing final layer of backfill. Remove all ropes and wires from tops of balls. Dish top of backfill to allow for mulching.

E. Mulch plant pits. Provide not less than 3" thickness of mulch and work into top of backfill and finish level with adjacent finish grades. Mulch within 24 hours of planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

F. Apply anti-desiccant using power spray to provide an adequate film over trunks, branches, stems, twigs and foliage.

1. If deciduous trees or shrubs are moved during full-leaf period, spray with anti-desiccant at nursery prior to moving and again two weeks after planting.

G. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by Architect, do not cut tree leaders and remove only injured or dead branches from flowering trees. Prune shrubs to retain natural character. Prune evergreens only to remove broken or damaged branches.

H. Remove and replace excessively pruned or misformed stock resulting from improper pruning.

I. Wrap tree trunks of 3/4" caliper and larger. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping. Start at ground and cover

trunk to height of first branches and securely attach. The overlap shall not be less than 1/3 the width of the tree wrap. The wrapping shall be securely fastened with tree-wrap at top, middle and bottom. Stapling and the use of nylon reinforced strapping tape are not approved fastening methods.

2.3 MAINTENANCE

- A. Begin maintenance immediately after planting. Maintain trees, shrubs and other plants until final acceptance of the entire project and through the required maintenance and establishment period as noted above.
- B. Maintain trees, shrubs and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease. Water trees and shrubs not less than twice per week until final acceptance.

2.4 CLEANUP AND PROTECTION

- A. During landscape work, keep pavements clean and work areas in an orderly condition.
- B. At completion of establishment period the Contractor shall remove all stakes, guy wires, rubber hose guards, and wrapping and dispose of materials off-site.

END OF SECTION

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**THIS PAGE CONCLUDES
THE
SPECIFICATIONS
FOR THE
VALLEY CITY PARK – PHASE 1 RENOVATIONS
FOR
VALLEY, NE**



DATE: June 18, 2024

TO: Mayor and City Council
Dave Ptak, City Administrator
Jeff Farnham, City Attorney
Andrea Griffin, City Attorney
Christie Donnermeyer, City Clerk
File

FROM: Gregory Perry, PE City Engineer

RE: 270th Street and Maple Road Intersection Review
Valley, Nebraska
EEG #23-62

The purposed of this memorandum is to present the review of the existing intersection of 270th Street and Maple Road to address the request by the City Council and citizens about any potential changes to the intersection. The existing speed limits on 270th Street and Maple Road are 45 mph in both directions. The request from City Council is to review the sweeping curve on the northeast corner of the intersection for the possibility to convert the two-way traffic pattern on the curve to one-way traffic flow. This request would be similar to the one-way traffic flow on the sweeping curve at 264th Street and Maple Road.

Roadway Geometrics

The existing street is a 24-foot wide, non-curb asphalt bituminous pavement section with drainage ditches along the roadway. The street has local street connections from adjacent residential developments within the corridor. The topography of the development is flat. The horizontal curves exceed 500-foot centerline radius. The street corridor includes the recently construction Douglas County Trail network along the northern ½-mile on 270th Street for pedestrians use along the street as a shared-use path.

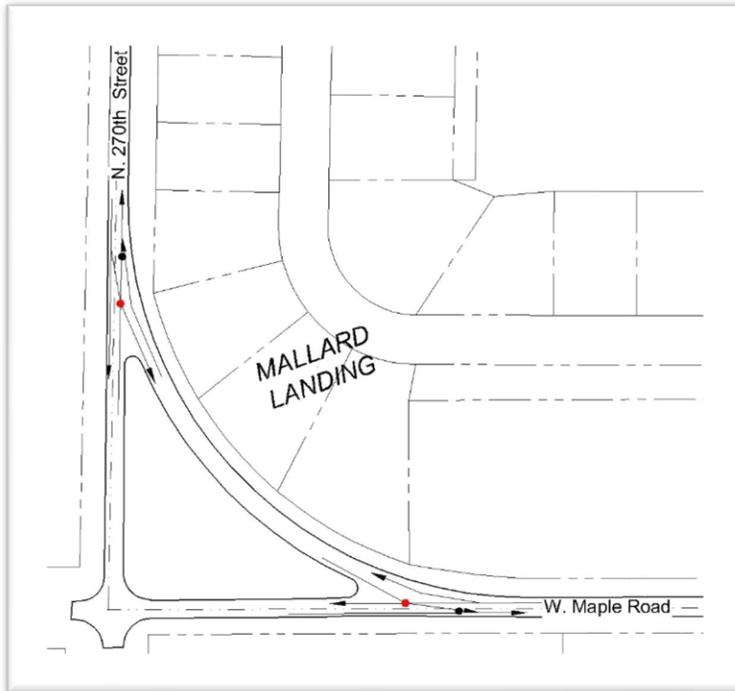
Data Collection

No data collection was included as part of this review memorandum.

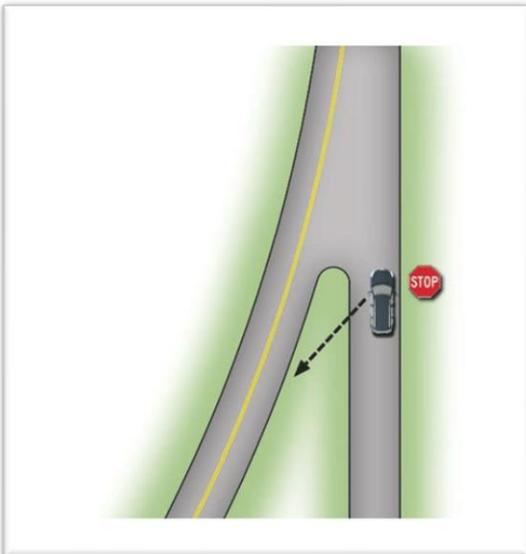
Previous traffic impact studies within the area provided the intersection have approximately 1,500 vehicles per day with a peak hour volume of 70 vehicles in 2022.

Data Analysis

The modification on the southbound to eastbound two-way traffic pattern on the sweeping curve to a one-way northbound traffic only on the sweeping curve would remove two intersection conflict points as shown on the figure below in red.



Another benefit on converting the two-way traffic pattern to one way traffic pattern, would remove the two stop conditions that occur at the intersection skew. While the intersections with the sweeping curve do not have restrictions for intersection sight lines, the intersection geometry does require the driver to have more mobility to see over-the-shoulder to view oncoming traffic as shown on the figure below:



According to the Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways, 2009 Edition, Section 2B.07, the intersection would not meet the multi-stop warrants based on traffic volume.



Crash Analysis

Crash data was collected from the Nebraska Department of Transportation for the available 10-year period starting in 2011 and ending on 2020. During the 10-year period, there was one recorded crash at the intersection.

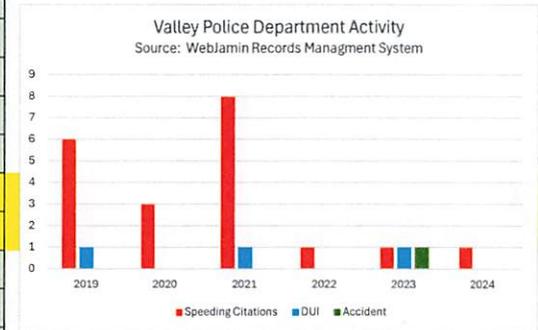
Conclusion and Recommendations

In summary, the current intersection configuration operates at a safe and efficient level of service (LOS); however, we recommend modifying the intersection's northeast corner from a two-way traffic pattern to a one way, westbound to northbound, traffic movement to reduce intersection conflict points which will improve the driver's intersection sight distance on the existing northbound and eastbound stop conditions. Should you have any questions, please feel free to contact me.

Case Number	Date	Time	Location	Call Type	Officer	Dept.	Incident Report	Call Subtype
VP1809003	08/31/2018	6:40	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP18090078	09/18/2018	23:02	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP18120059	12/14/2018	23:07	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP18120089	12/19/2018	5:19	270TH ST & RUGGLES ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP18120090	12/19/2018	6:32	270TH ST & RUGGLES ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19010011	01/03/2019	23:07	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19010055	01/09/2019	6:38	270TH ST & RUGGLES ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19020056	02/16/2019	13:06	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT	✓	expired plates
VP19040020	04/05/2019	21:43	270TH ST & TAYLOR ST VALLEY	DWIA - DWI Alcohol	Coffey, Robby	VALLEY POLICE DEPARTMENT	✓	DUI
VP19050037	05/10/2019	0:04	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19050079	05/17/2019	18:27	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19050110	05/22/2019	23:33	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP19110035	11/13/2019	20:35	270TH STREET & MAPLE STREET VALLEY	TRST - Traffic Stop	Muhle, Kurt	VALLEY POLICE DEPARTMENT		speeding
VP20060240	06/29/2020	18:50	270TH STREET & MAPLE STREET VALLEY	TRST - Traffic Stop	Muhle, Kurt	VALLEY POLICE DEPARTMENT		speeding
VP20080200	08/23/2020	12:35	270TH ST & RUGGLES ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP20090153	09/17/2020	6:14	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP20090204	09/23/2020	19:45	270TH STREET & TAYLOR STREET VALLEY	TRST - Traffic Stop	Muhle, Kurt	VALLEY POLICE DEPARTMENT	✓	expired plates
VP21010087	01/08/2021	21:30	270TH STREET & TAYLOR STREET VALLEY	TRST - Traffic Stop	Deemer, James Robert	VALLEY POLICE DEPARTMENT		expired plates
VP21020076	02/10/2021	6:25	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP21020200	02/22/2021	6:00	270TH STREET & TAYLOR STREER VALLEY	TRST - Traffic Stop	Deemer, James Robert	VALLEY POLICE DEPARTMENT		speeding
VP21040014	04/02/2021	20:15	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP21050142	05/11/2021	15:20	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Coffey, Robby	VALLEY POLICE DEPARTMENT		speeding
VP21050263	05/21/2021	16:35	270TH STREET & TAYLOR STREET VALLEY	TRST - Traffic Stop	Muhle, Kurt	VALLEY POLICE DEPARTMENT		speeding
VP21060394	06/29/2021	8:17	270TH ST & TAYLOR ST VALLEY	TRST - Traffic Stop	Dunham, David	VALLEY POLICE DEPARTM		speeding
VP21070239	07/19/2021	17:30	270TH STREET & RUGGLES STREET VALLEY	TRST - Traffic Stop	Muhle, Kurt	VALLEY POLICE DEPARTMENT		speeding
VP21080058	08/04/2021	15:45	270TH STREET & RUGGLES TO MEIGS VALLEY	SELECT - Selective Enforcement	Dunham, David	VALLEY POLICE DEPARTMENT		speeding
VP21100131	10/10/2021	1:36	270TH ST & TAYLOR ST VALLEY	DWIA - DWI Alcohol	Coffey, Robby	VALLEY POLICE DEPARTMENT	✓	DUI
VP22090087	09/08/2022	19:02	5000 BLOCK & 270TH ST. VALLEY	TRST - Traffic Stop	Dunham, David	VALLEY POLICE DEPARTMENT		speeding
VP23030220	03/26/2023	16:49	270TH STREET & RUGGLES STREET VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT		expired plates
VP23040246	04/18/2023	19:58	270TH STREET & WEST MAPLE ROAD VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT		expired plates
s	04/25/2023	8:07	TAYLOR & 270TH ST VALLEY	TRST - Traffic Stop	Dunham, David	VALLEY POLICE DEPARTMENT		speeding
VP23070016	07/03/2023	12:11	270TH STREET & WEST MAPLE ROAD VALLEY	DWIA - DWI Alcohol	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT	✓	DUI
VP23100320	10/21/2023	20:10	270TH STREET & RUGGLES STREET VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT	✓	speeding
VP23100367	10/24/2023	23:58	270TH STREET & MAPLE ROAD VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT		equipment
VP23100366	10/25/2023	1:00	264th and Maple Road	ACNI	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT		Accident
VP24050121	05/28/2024	19:32	270TH STREET & TAYLOR ST VALLEY	TRST - Traffic Stop	Dohrmann, Kenneth	VALLEY POLICE DEPARTMENT		speeding

Speeding Citations DUI Accident

Year	Speeding Citations	DUI	Accident
2019	6	1	0
2020	3	0	0
2021	8	1	0
2022	1	0	0
2023	1	1	1
2024	1	0	0



originated on 270th curve



DOUGLAS COUNTY SHERIFF'S OFFICE
Uniform Services Bureau – Community Action Unit

SMART TRAILER TRAFFIC SURVEY REPORT

Survey Location: N. 270th & Taylor Street

Survey Operator: Sergeant J. Welsch, S-389

Beginning: Mon / 18 Mar 24 / 1000

Ending: Wed / 27 Mar 24 / 1000

A. Authorization, Conditions, and Limitations on Use (41.1.3a):

This survey was initiated based on complaint(s) received by Sergeant J. Welsch, S-389, Community Action Team 1 Sergeant. The speed Trailer was placed on the east side of N. 270th St, just north of Taylor Street, with the display facing northbound. The conducted survey recorded both east and west bound traffic with a minimum speed of 1MPH. The conditions were cloudy and dry with seasonal temperatures at the start of the survey. When the survey concluded the conditions were cloudy and dry with seasonal temperatures.

B. Qualifications of Personnel Assigned to Operate Trailer (41.1.3b):

Sergeant J. Welsch, S-389, is a 19-year veteran of the Douglas County Sheriff's Office and currently assigned to the DCSO Community Action Unit. Welsch was initially certified as Police Radar Operator in 2004, recertifying every four years in 2008, 2012, 2016, and 2020 per DCSO policy. As of January 2017, Welsch is a certified traffic radar / laser instructor through IPTM. Welsch has received advanced training in motor vehicle collision investigation through the level of collision reconstruction which includes roadway design and road hazard identification.

C. Person Responsible for Condition and Maintenance of Equipment (41.1.3c):

Traffic Unit Sergeant Welsch was appointed as the responsible party for SMART Trailer operations by the Uniform Services Bureau Captain, Eric Sellers, in September 2015.

D. Listing of Equipment, if any (41.1.3d):

Stalker portable message trailer #1

Report Continued on Next Page.

SURVEY DATA

Survey Length:	9 Days
Posted Speed Limit:	45 MPH
Survey Direction:	North & South bound
Survey Average Speed:	45 MPH
Total Vehicle Count:	6,899 Vehicles

Survey Speed Details

Nebraska Revised Statute 60-6186 divides the offense of speeding into six categories for penalty purposes. The recorded survey speed data is reported according to these categories.

- 1-45 MPH (Legal Operation) – 3721 Vehicles (53.935% of Total Vehicles)
- 46-50 MPH (Speeding 1 to 5 MPH over) – 2,023 Vehicles (29.323% of Total Vehicles)
- 51-55 MPH (Speeding 6 to 10 over MPH)– 839 Vehicles (12.161% of Total Vehicles)
- 56-60 MPH (Speeding 11 to 15 over MPH)– 217 Vehicles (3.145% of Total Vehicles)
- 61-65 MPH (Speeding 16 to 20 MPH over) – 59 Vehicles (0.855% of Total Vehicles)
- 66-80 MPH (Speeding 21 to 35 MPH over) – 34 Vehicles (0.493% of Total Vehicles)
- 81+ MPH (Speeding 36 or more MPH over) – 6 Vehicle (0.087% of Total Vehicles)

Survey Data Evaluation

- The highest speed recorded during the survey was **91 MPH** (46 MPH over the posted speed limit).
- 16.742% of vehicles recorded during the survey were 6 or more MPH over the posted speed limit.
- 29.323% of vehicles recorded during the survey were 1 to 5 MPH over the posted maximum speed limit.
- 46.065% of vehicles recorded during the survey indicated a violation of Nebraska Revised Statute 60-6186 (Speeding) by driving 1 or more MPH over the posted speed limit of 45 MPH.

Report Continued on Next Page.

Conclusion and Opinions of Survey Operator

The Douglas County Sheriff's Office is committed to the enforcement of traffic laws by issuing citations to traffic law violators which has been proven to increase public safety through the reduction of motor vehicle collisions. While the DCSO would like the ability to apprehend all law violators, the present resources of the DCSO require selective enforcement of traffic law violations to those which pose the greatest risks to public safety at times when violations are likely to be observed as studies have indicated violation enforcement is the most effective way to reduce violations. The survey at 270th & Taylor St. indicated the 85th percentile speed of 51 MPH, **6 MPH OVER** the posted 45 MPH speed limit. IACP (International Association of Chiefs of Police) recommendations are that enforcement efforts be focused in areas where the 85th percentile speeds are more than 5 MPH **OVER** the posted speed limit. **Based on the conducted survey and IACP recommendations, enforcement actions should be focused on this area until we see a decline in violations.**

27mar24
Date of Report

SAL 5389
Sergeant J. Welsch

S-389