CITY OF FAYETTEVILLE
INVITATION TO BID

NC VETERANS PARK PHASE II

COF 1517026

ISSUED: **August 21, 2026**

DUE: **September 23, 2026**

The City of Fayetteville is soliciting bids for Phase II of the North Carolina Veterans Park. Adjacent to the Airborne & Special Operations Museum in downtown Fayetteville, Phase II is designed to be a new passive recreation space promoting pedestrian connectivity to downtown and offering new trails & open space for hosting a range of community events.

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Funding Source: Local

ISSUED BY:

CITY OF FAYETTEVILLE

PRIMARY CONTACT

KIMBERLY TOON, PURCHASING MANAGER

kimberlytoon@fayettevillenc.gov

Phone: (910) 433−1942

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NOTICE TO BIDDERS

Pursuant to N.C.G.S. 143-129 sealed proposals will be received by the City of Fayetteville, until **2:00 p.m., September 23, 2026,** at City Hall, 433 Hay Street, Fayetteville, North Carolina, at which time they will be considered for the purchase of the following:

NC Veterans Park Phase II

Bids may be mailed to the City Purchasing Office, Attn: Kimberly Toon, 433 Hay Street Fayetteville, NC 28301, or may be delivered in person or by express mail to 433 Hay Street, Fayetteville, NC 28301.

The bid opening will be held at **2:00 p.m. on September 23, 2026,** at City Hall, 433 Hay Street, Fayetteville, NC 28301, for the project entitled, "NC Veterans Park II"

Plans, specifications and bid documents may be obtained in the Purchasing Office of the City of Fayetteville, 2nd floor, City Hall, 433 Hay Street, Fayetteville, North Carolina, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday or by email request to kimberlytoon@fayettevillenc.gov

The City reserves the right to reject any or all bids, to waive minor informalities or irregularities, and to award the contract to the lowest responsive and responsible bidder whose bid conforms to all material requirements of the Invitation to Bid.

The Bid Documents may be obtained by the following instructions posted at the following location: https://www.fayettevillenc.gov/City-Departments/Finance/Purchasing/Bid-Opportunities

Bidders are responsible for monitoring this site for addenda and other pertinent documents.
The date that the Bidding Documents are transmitted by the Issuing Office will be considered the bidder's date of receipt of the Bidding Documents. Partial sets of Bidding Documents will not be available from the Issuing Office. The Owner will not be responsible for full or partial sets of Bidding Documents, including Addenda, if any, obtained from sources other than the Issuing Office.

City of Fayetteville
Kimberly Toon, CLGPO
Purchasing Manger

FAYETTEVILLE NC

AMERICA'S CAN DO CITY

A message from the City of Fayetteville City Manager, Dr. Douglas J. Hewett, ICMA-CM

The City of Fayetteville is fully committed to providing Small Local Business Enterprises (SLBEs) and small businesses an equal opportunity to participate in all aspects of City contracting, including but not limited to participation in the procurement of contracts relating to construction, professional services, equipment, supplies, and improvements to facilities throughout the City.

It is the policy of the City to prohibit discrimination against any person or business in pursuit of these opportunities on the basis of race, sex, color, religion, national origin, age, or disability, and to conduct its contracting and purchasing programs so as to prevent such discrimination. The City is committed to following all applicable federal, state, and local laws as they relate to procurement practices.

Small Business Participation Commitment

The City will actively seek and identify qualified small businesses, including SLBEs, and offer them the opportunity to participate in the procurement of contracts for all City purchasing and service contracts as well as construction and repair contracts. The City aspires to spend 40% of its eligible contract dollars with small local suppliers and contractors.

Small Business Enterprise Program

The City's Charter has been amended by the General Assembly (H.B. 198) to establish a small business enterprise program to promote the development of small local businesses. The City is authorized to establish bid and proposal specifications that include measures to enhance participation by small business enterprises located in Cumberland and Hoke Counties, including:

- Arranging solicitations, specifications, and contract requirements to facilitate small business participation
- Providing technical assistance and capacity building programs
- Carrying out information and communication programs on contracting procedures and opportunities
- Implementing outreach programs to identify and engage qualified small businesses
- Offering supportive services to help small businesses compete effectively
- Ensuring prompt payment to subcontractors
- Simplifying bonding and insurance requirements where appropriate

Federal and State-Funded Projects - Important Notice

In accordance with state directive following the U.S. Department of Transportation's October 3, 2025 Interim Final Rule to 49 CFR Part 26:

FAYETTEVILLE NC
AMERICA'S CAN DO CITY

For Federally-Funded Contracts:

- No DBE goals may be established for federally-funded contracts until further guidance is provided by the state
- All existing DBE certifications are in suspended status pending Unified Certification Program (UCP) reevaluation under new individualized disadvantage standards
- Firms are not required to submit DBE participation commitments at this time

For State-Funded Contracts:

- No MB/WBE goals may be established for state-funded contracts until further guidance is provided by the state

The City will continue to facilitate participation by all qualified small businesses through the measures listed above and will resume DBE and MB/WBE program activities once the state provides further guidance.

Equal Opportunity for All

The City is committed to:

- Providing equal access to contracting opportunities for all qualified businesses
- Removing barriers to small business participation
- Supporting economic development and capacity building in our community
- Ensuring fair and open competition in all procurements
- Maintaining compliance with all applicable federal, state, and local requirements
- Supporting diversity in our supplier and contractor base

For more information or questions about the SLBE policy, please contact the Purchasing Division at 910-433-1942.

CITY OF FAYETTEVILLE

Dr. Douglas J. Hewett, ICMA-CM
City Manager

SPECIAL PROVISIONS

PERFORMANCE AND DELIVERY

NC VETERANS PARK PHASE II

Bid Receipt Date:	**September 23, 2026, at 2 pm EST** **Attention: Kimberly Toon** **433 Hay Street, Fayetteville, NC 28301**
Optional Pre-Bid Conference:	**September 2, 2026, at 2:00 pm EST** **433 Hay Street, Fayetteville, NC 28301** **Lafayette Conference Room (1st Floor-City Hall)**
Estimated Contract Duration:	**190 Calendar Days**
Estimated Construction Start:	**October 15, 2026**
Estimated Construction Completion:	**April 23, 2027**
Contract Time:	**190 Calendar Days**
Liquidated Damages:	**Time is of the essence for this project.** **$1,000.00 per calendar day for each day of overrun** **$1,000.00 per calendar day for each day of unauthorized suspension.**
Bid Acceptance Period	**Ninety (90) Calendar Days unless otherwise noted**

The Project scope includes: Phase II park development North of Cross Creek. Work including site grading/clearing, flatwork paving, lighting, landscape & irrigation improvements, and monumentation will be constructed with this project.

Questions regarding this bid must be submit in writing by e-mail to Ms. Kimberly Toon, City of Fayetteville, to kimberlytoon@fayettevillenc.gov no later than **5:00 pm September 9, 2026.**

Bidders are expressly prohibited from contacting any City of Fayetteville official or employee associated with this Request for Proposal, except as noted above. Violation of this prohibition is grounds for the immediate disqualification of the bidder.

Work Hour Restriction: Limit work to between 7:00 a.m. to 6:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction

Bid Form Submittal Checklist

NC Veterans Park II			
Included? (Please Initial)	**Name or description of form**	**Necessary to submit this form?**	**When to submit it?**
	Completed Proposal Package w/ acknowledgement of and addenda.	Yes	With the bid
	Bid Proposal & Schedule of Prices	Yes	With the bid
	List of Subcontractors	Yes	With the bid
	Addenda Attached	Yes	With the bid
	Bid Bond 5% Attached	Yes	With the bid
	Signed Non-Collusion Affidavit	Yes	With the bid
	Certification of Primary Participant, Regarding Debarment, Suspension, and other responsibility matters	Yes	With the bid
	Qualifications of Bidders	Yes	With the bid
	Certification of Financial Conditions	Yes	With the bid
	Performance Bond / Payment Bond and Power of Attorney	Yes	With Signed Contract
	Certificate of Insurance	Yes	With Signed Contract

If this is not submitted with the bid, you shall be deemed non-responsive.

CITY OF FAYETTEVILLE
NC Veterans Park Phase II

BID PROPOSAL PACKAGE

The undersigned hereby proposes to furnish materials and perform the work for this project per the items listed herein in strict accordance with the Standard Specifications, contained in the documents for the consideration of prices quoted for the enclosed contract items.

THE CITY RESERVES THE RIGHT TO ELIMINATE OR ADD TO THIS CONTRACT.

IMPORTANT TAX NOTICE: Bid prices shall EXCLUDE North Carolina sales and use tax on materials that become a permanent part of this project (asphalt, concrete, aggregate, fencing, etc.), as these materials are tax-exempt pursuant to N.C. Gen. Stat. § 105-164.14(b). Equipment rental, consumables, and temporary materials remain taxable and should be included in bid pricing. See Special Provisions for complete details.

This Bid Package is executed by:

Name_____ Title_____

Company Name _____

Address _____

Email _____

Signature_____ Phone No. _____

License #_____ Bid Amount $_____

Written _____

ACKNOWLEDGEMENT OF ADDENDA

The Vendor has received, acknowledged, and used the following addenda in completing the Proposal. (Initial and Date as appropriate)

Addendum No. 1_____	Dated:_____
Addendum No. 2_____	Dated:_____
Addendum No. 3_____	Dated:_____
Addendum No. 4_____	Dated:_____

Bid Proposal & Schedule of Prices

Place Holder

BID PROPOSAL & SCHEDULE OF PRICES
VETERANS PARK PHASE II

Item No.	Description	Unit	Quantity	Unit Price	Amount
	BASE BID				
1	Mobilization (Note: This Item may not exceed 5% of the Grand Total Bid Amount)	LS	1	$	$
2	Construction Staking and Survey	LS	1	$	$
3	Site Demolition (Existing Pavement, RCP, Masonry)	LS	1	$	$
4	Temporary Diversion Ditch	LF	375	$	$
5	Earthwork / Grading	LS	1	$	$
6	Undercut Excavation	LS	1	$	$
7	Drainage Structures (Drop Inets & Grates)	EA	4	$	$
8	Drainage Structures (Outlets)	EA	2	$	$
9	Drainage RCP - 18"	LF	600	$	$
10	Rip Rap Armoring	SF	200	$	$
11	Concrete Paving (Medium Duty) (Including base courses and sub-grade prep)	SF	26,965	$	$
12	Concrete Paving (Specialty Finish - Exposed Aggregate) (Including base courses and sub-grade prep)	SF	2,398	$	$
13	Concrete Verticle Curb (Including base courses and sub-grade prep)	SF	179	$	$
14	Sand Blasted Word Inscription	LS	1	$	$
15	Flag Poles (Furnish and Install)	EA	2	$	$
16	Site Furnishing (Backed Benches)	EA	11	$	$
17	Site Furnishing (Trash Recepticles)	EA	5	$	$
18	Site Furnishig (Bike Racks)	EA	14	$	$
19	Bermuda Seed	SF	296,810	$	$
20	Topsoil Mix	LS	1	$	$
21	Electrical (Service Connection)	LS	1	$	$
22	Electrical (Pedestrian Light Pole Assemblies)	EA	16	$	$
23	Electrical (Conduit)	LS	1	$	$

24	Cast-in-Place Concrete Monument Sign (Furnish and Install per Sheet L-704)	LS	1	$_____	$_____
	BASE BID TOTAL				**$**_____

BID ALTERNATE #1

Hillsboro Street Parking Lot

A1 - 25	Parking Area Grading / Earthwork	LS	1	$_____	$_____
A1 - 26	Parking Area Undercut Excavation	LS	1	$_____	$_____
A1 - 27	Concrete Vertical Curb (Including base courses and sub-grade prep)	LF	366	$_____	$_____
A1 - 28	Wheel Stops	EA	35	$_____	$_____
A1 - 29	Asphalt Paving (Heavy Duty) (Including base courses and sub-grade prep)	SF	34,838	$_____	$_____
A1 - 30	Concrete Paving (Medium Duty) (Including base courses and sub-grade prep)	SF	589	$_____	$_____
A1 - 31	Pavement Markings	LF	1,782	$_____	$_____
A1 - 32	Signage	LS	1	$_____	$_____
A1 - 33	Tactile Warning Surfacing	SF	195	$_____	$_____
A1 - 34	Bollards	EA	25	$_____	$_____
A1 - 35	Drainage Structures (Drop Inets & Grates)	EA	1	$_____	$_____
A1 - 36	Drainage Structures (Outlets)	EA	1	$_____	$_____
A1 - 37	Drainage RCP - 18"	LF	117	$_____	$_____
A1 - 38	Rip Rap Armoring	SF	80	$_____	$_____
A1 - 39	Bermuda Seed	SF	18,597	$_____	$_____
A1 - 40	Topsoil Mix (Ornamental Plant Bed)	LS	1	$_____	$_____
A1 - 41	Electrical (Parking Light Pole Assemblies (Dual Head)	EA	1	$_____	$_____
A1 - 42	Electrical (Parking Light Pole Assemblies (Single Head)	EA	15	$_____	$_____
A1 - 43	Electrical (Conduit)	LS	1	$_____	$_____
	BID ALTERNATE #1 - TOTAL				**$**_____

BID ALTERNATE #2

Permeable Paver Application for Parking Lot

A2 - 44	Permeable Pavers (Heavy Duty) (Including base courses and sub-grade prep)	SF	34,838	$_____	$_____
A2 - 45	Concrete Paving (Medium Duty) (Including base courses and sub-grade prep)	SF	589	$_____	$_____

BID ALTERNATE #2 - TOTAL **$**_____

BID ALTERNATE #3

Landscape Planting & Irrigation

A3 - 46	3" Cal. Trees (B&B) (Staked & Mulched)	EA	45	$_____	$_____
A3 - 47	2" Cal. Trees (B&B) (Staked & Mulched)	EA	17	$_____	$_____
A3 - 48	3 Gal. Shrubs (Staked & Mulched)	EA	103	$_____	$_____
A3 - 49	1 Gal. Shrubs (Staked & Mulched)	EA	27	$_____	$_____
A3 - 49	Assorted Perennials (5"-7" Pots)	EA	770	$_____	$_____
A3 - 49	Assorted Sedges	SF	3,320	$_____	$_____
A3 - 50	Irrigation Design Plans	LS	1	$_____	$_____
A3 - 51	Irrigation System (includes furnishing and installation of all necessary equipment and materials for irrigation i.e pipes, valves, connectors, heads, etc.)	LS	1	$_____	$_____
A3 - 52	Irrigation (Tap & Meter)	LS	1	$_____	$_____

BID ALTERNATE #3 - TOTAL **$**_____

BID ALTERNATE #4

Cross Creek Trails

A4 - 53	Grading / Earthwork	LS	1	$_____	$_____
A4 - 54	Undercut Excavation	LS	1	$_____	$_____
A4 - 55	Pedestrian Pavement (Light Duty Asphalt) (Including base courses and sub-grade prep)	SF	8,783	$_____	$_____
	BID ALTERNATE #4 - TOTAL				$_____

* **10% Contingency (Base & Alts 1-4)** $_____

GRAND TOTAL BID AMOUNT (Base & Alts 1-4) $_____

***** A contingency line item will be included with the resulting contract and purchase order for this project. The contingency shall be used at the City's discretion and only upon written approval from the City. The amount listed as a contingency is not an obligation for payment from the City. Any unused contingency is retained by the City and is not payable to the Contractor.

LIST OF SUBCONTRACTORS

The Prime Contractor states that his Bid is based on the following Subcontractors for the categories of work listed which may exceed 5% of the Contract work; the Prime Contractor agrees that if he is the successful Bidder and if the listed Subcontractors are approved by the Owner's Representative, he shall contract with the approved listed Subcontractors for the performance of this work.

Trade	**Company Name**	**License Number**
Plumbing/Irrigation Contractor		
Landscape Contractor		
Electrical Contractor		

THIS FORM SHALL BE SUBMITTED WITH PROPOSAL

_____
COMPANY

_____
BIDDER'S SIGNATURE

_____
TITLE

ADDENDA

ATTACH

BID BOND

ATTACH

NON-COLLUSION AFFIDAVIT

STATE OF NORTH CAROLINA

_____, being first duly sworn, deposes and says that:

1. He/She is the_____of _____, the bidder that has submitted the attached bid;

2. He/She is fully informed respecting the preparation and contents of the attached bid and of all pertinent circumstances respecting such bid;

3. Such bid is genuine and is not a **collusive or sham** bid;

4. Neither the said bidder nor any of its officers, partners, owners agents, representatives, employees, parties of interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly, with any other bidder, firm or person to submit a **collusive or sham** bid in connection with the contract for which the attached bid has been submitted or to refrain from bidding in connection with such contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm or person to fix the price or prices in the attached bid or of any other bidder, or to fix any overhead, profit or cost element of the bid price of any other bidder or to secure through collusion, conspiracy, connivance or unlawful agreement any advantage against the City of Fayetteville or any person interested in the proposed contract; and

5. The price or prices quoted in the attached bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the bidder or any of its agents, representatives, owners, or parties in interest, including this affiant.

_____
TITLE

Subscribed and
sworn before me,
this___ day of_____,20___.

(SEAL)

_____
Notary Public

My Commission Expires_____

NC VETERANS PARK PHASE II

CERTIFICATION OF PRIMARY PARTICIPANT

REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

The Primary Participant,_____(major third party contractor), certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction or records, making false statements, or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and

4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. (If the primary participant is unable to certify to any of the statements in this certification, the participant shall attach an explanation to this certification.)

THE PRIMARY PARTICIPANT _____CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET. SEQ. ARE APPLICABLE THERETO.

_____ _____

SIGNATURE TITLE

_____ _____

PRINTED NAME DATE

REQUIRED CONTRACTOR CERTIFICATIONS

By submitting a bid, the Bidder certifies each of the following, and the successful Bidder shall reaffirm each certification at contract execution:

(1) E-Verify. The Bidder, and each of the Bidder's subcontractors under the resulting contract, complies with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. This certification is required by N.C. Gen. Stat. § 143-133.3.

(2) Iran Divestment. The Bidder is not identified on the Final Divestment List or any other list of prohibited investments created by the North Carolina State Treasurer under N.C. Gen. Stat. § 147-86.58, and will not take any action causing it to appear on that list during the term of the resulting contract.

(3) Israel Boycott. The Bidder has not been designated by the North Carolina State Treasurer under N.C. Gen. Stat. § 147-86.81 as a company engaged in a boycott of Israel, and will not take any action causing it to be so designated during the term of the resulting contract.

(4) Conflict of Interest. No officer, employee, or agent of the City who exercises or has exercised any function or responsibility with respect to this project, or who is in a position to participate in a decision-making process or to gain inside information with regard to this project, has or shall have any direct or indirect personal or financial interest in the resulting contract or in the proceeds thereof. The Bidder further certifies that it has not violated N.C. Gen. Stat. § 14-234 or § 133-32 in connection with this solicitation.

QUALIFICATIONS OF BIDDERS

In order to assist the Owner in determining whether the Bidder is qualified to perform the Work, as set forth in the Contract Documents, the Bidder shall furnish the following information as an attachment to the Bid Form to assist the owner in evaluating the Bidder's qualifications.

Years Bidder has been in business providing similar services to that as outlined in these Bid Documents under the same business name and legal entity: _____

List **three (3)** Project References who are qualified to judge as to the Bidder's financial responsibility and his experience in providing similar equipment and performing work within the last five (5) years of a similar nature to that as outlined in these Bid Documents.

REFERENCE – NBR 1	**RESPONSE**
Client / Project	
Scope of Work	
Contract Value	
Contact Start Date	
Contract Completion Date	
Valid Contact Name	
Valid Contact Email	
Valid Contact Phone	

REFEREANCE - NBR 2	**RESPONSE**
Client / Project	
Scope	
Contract Value	
Completion Date	
Valid Contact Name	
Valid Contact Email	
Valid Contact Phone	

REFEREANCE - NBR 3	**RESPONSE**
Client / Project	
Scope	
Contract Value	
Completion Date	
Valid Contact Name	
Valid Contact Email	
Valid Contact Phone	

Bidder shall attach additional pages, if necessary, in order to complete the required information.

CERTIFICATION OF FINANCIAL CONDITION

Name of Contractor: _____ The undersigned hereby certifies that: [check all applicable boxes]

☐ The Contractor is in sound financial condition and, if applicable, has received an unqualified audit opinion for the latest audit of its financial statements.

Date of latest audit: _____

☐ The Contractor has no outstanding liabilities, including tax and judgment liens, to the Internal Revenue Service or any other government entity.

☐ The Contractor is current in all amounts due for payments of federal and state taxes and required employment- related contributions and withholdings.

☐ The Contractor is not the subject of any current litigation or findings of noncompliance under federal or state law.

☐ The Contractor has not been the subject of any past or current litigation, findings in any past litigation, or findings of noncompliance under federal or state law that may impact in any way its ability to fulfill the requirements of this Contract.

☐ He or she is authorized to make the foregoing statements on behalf of the Contractor.

Note: This shall constitute a continuing certification and Contractor shall notify the Owner within 15 days of any material change to any of the representations made herein.

If any one or more of the foregoing boxes is NOT checked, Contractor shall explain the reason in the space below:

SECTION B – CONTRACT AWARD DOCUMENTS

CONTRACT
PERFORMANCE BOND
PAYMENT BOND
POWER OF ATTORNEY
CERTIFICATE(S) OF INSURANCE
NOTICE TO PROCEED

The City of Fayetteville General Construction Contract, in the form attached in this Section B, is the contract the successful Bidder will be required to execute.

CITY OF FAYETTEVILLE GENERAL CONTRACTING TERMS

The following General Contracting Terms will be incorporated into the Professional Services Agreement with the selected firm:

ASSIGNMENT

It is the intent of this Agreement to secure the personal services of Contractor and failure of Contractor for any reason to make the personal services available to the City of Fayetteville for the purposes described in this contract shall be cause for termination of this contract. Contractor shall not assign this contract without prior written consent of the City of Fayetteville.

GOVERNING LAW

The validity, interpretation, and execution of this contract and the performance of and rights accruing under this Contract are all to be governed by the laws of North Carolina.

COMPLIANCE WITH LAWS

Contractor agrees to comply with all applicable statutes, ordinances, and regulations of the United States, the State of North Carolina, the City and units of local government.

SEVERABILITY

The parties agree that if any provision of this contract shall be held invalid for any reason, the remaining provisions shall not be affected if they may continue to conform with the purposes of this contract and the requirements of applicable law.

DEFAULT

In the event of substantial failure by Contractor to perform in accordance with the terms of this contract, City of Fayetteville shall have the right to terminate Contractor upon ten (10) days written notice in which event Contractor shall have neither the obligation nor the right to perform further services under this contract nor shall the City of Fayetteville be obligated to make any further payment for work that has not been performed.

DIVESTMENT OF COMPANIES BOYCOTTING ISRAEL OR INVESTING IN IRAN CERTIFICATION

Contractor certifies that: (i) it is not identified on the Final Divestment List or any other list of prohibited investments created by the NC State Treasurer pursuant to N.C.G.S. 147-86.58; (ii) it has not been designated by the NC State Treasurer pursuant to N.C.G.S. 147-86.81 as a company engaged in the boycott of Israel ((i) and (ii) to be collectively referred to as "FD Lists"); and (iii) it will not take any action causing it to appear on the Treasurer's FD Lists created by the NC State Treasurer during the term of this Contract. By signing this Contract, Contractor further agrees, as an independent obligation, separate and apart from this Contract, to reimburse the City for any and all damages, costs and attorneys' fees incurred by the City in connection with any claim that this Contract or any part thereof is void due to Contractor appearing on the Treasurer's FD Lists at any time before or during the term of this Contract.

E-VERIFY

Contractor hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance

with NCGS §64-26(a). Contractor hereby pledges, attests and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes and further pledges, attests and warrants that any subcontractors currently employed by or subsequently hired by Contractor shall comply with any and all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Agreement.

FORCE MAJEURE

Neither party shall be deemed to be in default of its obligations hereunder if and *so long as* it is prevented from performing such obligations by an act of war, hostile foreign actions, adverse governmental actions, nuclear explosion, earthquake, hurricane, tornado, or other catastrophic natural event or act of God.

MORALITY CLAUSE

If, in the sole opinion of the City, at any time Contractor any of its owner(s) or employee(s) or agent(s) (collectively referenced as an "Actor") engages in any one or more of the actions below, the City may immediately upon written notice to Contractor, terminate this Agreement, in addition to any other rights and remedies that the City may have hereunder or at law or in equity:

1. bring disrepute, contempt, scandal, or public ridicule to the Actor;
2. subject the Actor to prosecution;
3. offend the community or public morals/decency;
4. denigrate individuals or groups in the community served by the City;
5. is scandalous or inconsistent with community standards or good citizenship;
6. adversely affect the City's finances, public standing, image, or reputation;
7. is embarrassing or offensive to the City or may reflect unfavorably on the City; and,
8. is derogatory or offensive to one or more employee(s) or customer(s) of the City.

NON-APPROPRIATION

Notwithstanding any other provisions of this contract, the parties agree that payments due hereunder from the City are from appropriations and monies from the City Council and any other governmental entities. In the event sufficient appropriations or monies are not made available to the City to pay the terms of this agreement for any fiscal year, this contract shall terminate immediately without further obligation of City.

INDEMNIFICATION

To the extent permitted by law, the Contractor agrees to defend, indemnify and hold harmless the City, its elected officials, employees, agents, successors, and assigns, from any and all liability and claims for any injury or damage caused by any act, omission or negligence of the Contractor, its agents, servants, employees, contractors, licensees, or invitees. Indemnification of the City by the Contractor does not constitute a waiver of the City's governmental immunity in any respects under North Carolina law. Contractor assumes entire responsibility and liability for losses, expenses, demands and claims in connection with or arising out of any injury, or alleged injury (including death) to any person, or damage, or alleged damage, to property of the City or others sustained or alleged to have been sustained in connection with or to have arisen out of or resulting from the negligence of the Contractor, his Subcontractor, agents, and employees, in the performance of the work/service set forth in the Standard Specifications and Special Provisions, and any changes, addenda, or modifications including losses, expenses or damages sustained by the City, and agrees to indemnify and hold harmless the City, its officials, employees or volunteers from any and all such losses, expenses, damages, demands and claims and agrees to defend any suit or action brought against them, or any of them, based on any such alleged injury or damage, and to pay all damages, cost and expenses in connection therewith or resulting therefrom. As an integral part of this Agreement, Contractor agrees to purchase and maintain during the life of this

Agreement contractual liability insurance in the amount required in the general liability insurance requirements and to furnish proper evidence thereof. Indemnification by the Contractor does not constitute a waiver of the City's governmental immunity in any respect under North Carolina law.

TERMINATION FOR CAUSE

In the event of substantial failure by Contractor to perform in accordance with the terms of this contract, City of Fayetteville shall have the right to terminate Contractor upon ten calendar (10) days written notice in which event Contractor shall have neither the obligation nor the right to perform further services under this contract nor shall the City of Fayetteville be obligated to make any further payment for work that has not been performed. Contractor shall provide to the City of Fayetteville all reports, surveys or other related documents upon the City's request.

TERMINATION FOR CONVENIENCE

Upon thirty (30) calendar days' written notice to Contractor, the City of Fayetteville may, without cause and without prejudice to any other right or remedy legally available to the City of Fayetteville, terminate this Contract. Upon such notice, Contractor shall have neither the obligation nor the right to perform services under this contract nor shall the City of Fayetteville be obligated to make any further payment for work that has not been performed in accordance with the terms stated herein. In such case of termination, Contractor shall be paid for the completed and accepted work executed in accordance with this Contract prior to the written notice of termination. Additionally, upon mutual agreement, Contractor may be paid for any completed and accepted work which takes place in order to achieve a specifically identified item in the scope of services or a milestone of the Contract, between the written notice of termination and the effective date of termination. Unless otherwise stated or agreed upon, the effective date of termination shall automatically occur 30 days after the written notice is sent by the City of Fayetteville. Contractor shall provide to the City of Fayetteville all reports, surveys or other related documents upon the City's request.

TERMINATING ILLEGAL DISCRIMINATION CERTIFICATION: Contractor certifies that: (i) it does not operate any DEI programs that violate any applicable Federal anti-discrimination laws, (ii) it is compliant in all respects with all applicable Federal anti-discrimination laws material to the government's payment decisions, and (iii) agrees that, if a violation of this certification is found, could lead to liability under the False Claims Act. By signing this Agreement, Contractor further agrees, as an independent obligation, separate and apart from this Agreement, to reimburse the City for any and all damages, costs and attorneys' fees incurred by the City in connection with any claim that this Agreement or any part thereof is void due to Contractor's noncompliance with this certification at any time before or during the term of this Agreement.

SURVIVAL OF TERMS

All warranties, covenants, and representations contained within this contact and all applicable work authorizations, if any, shall continue in full force and effect for three (3) years after the execution and delivery of the final product, act, or service taken in furtherance of this contract. Survivability shall not be impacted, or otherwise shall not be rendered null or void, by the termination or natural expiration of this contract or other applicable work undertaken in furtherance of this contract.

VENUE AND FORUM SELECTION

The Parties expressly agree that if litigation is brought in connection with this contract and (1) the litigation proceeds in the Courts of the State of North Carolina, the parties agree that the appropriate venue shall be in Cumberland County (Fourteenth Judicial District of North Carolina); or (2) the litigation proceeds in a federal court, the parties agree that the appropriate venue shall be the United States District Court for the Eastern District of North Carolina.

INDEPENDENT CONTRACTOR

Contractor is an Independent Contractor and shall undertake performance of the services pursuant to the terms of this Agreement as an Independent Contractor. Contractor shall be wholly responsible for the methods, means and techniques of performance. City shall have no right to supervise methods and techniques of performance employed by Contractor but City shall have the right to observe such performance.

AMENDMENT

The City and Contractor may, from time to time, request changes in services to be performed by Contractor. Any such changes that are mutually agreed upon by the City and Contractor shall be incorporated herein by written amendment to this Agreement. It is mutually agreed and understood that no alteration or validation of the terms of this Agreement shall be valid unless made in writing and signed by the Parties hereto, and that any oral understanding or agreements not incorporated herein, unless made in writing and signed by the Parties hereto, shall not be binding.

ENTIRE AGREEMENT

Agreement constitutes the entire agreement between the Parties. Any proposed change to this Agreement shall be submitted to the City for its prior approval. No modification, addition, deletion, etc., to this Agreement shall be effective unless and until such changes are reduced to writing and executed by the authorized officers of each Party.

_____

Contractor Name (Print)

_____

Contractor Signature

_____

Date of Signature

CITY OF FAYETTEVILLE

GENERAL CONSTRUCTION CONTRACT

This Contract is issued for a project funded with City General Fund or other local funds. Federal contract provisions, including Davis-Bacon prevailing wage requirements, Buy America and Build America, Buy America requirements, and federal civil rights and disadvantaged business enterprise certifications, do not apply to this Contract. If federal funding is added to this project by amendment, the applicable federal provisions shall be incorporated by written amendment before any federally funded work is performed.

Project Name/Description:	
Site Address:	
City Department:	
Vendor Name:	
Total Contract Amount:	$
Funding Source (General Fund / Local Funds):	
Fund / Account No.:	
Bid Proposal Date:	
Council Approval Date:	
Contract Start Date:	
Projected Completion Date:	
Contract Time (Calendar Days):	
Liquidated Damages — Delay (per day):	
Liquidated Damages — Unauthorized Suspension (per day):	

This contract ("Contract") is made this xx day of Month of 2026 by Company Name hereinafter called Contractor, and the City of Fayetteville, North Carolina, hereinafter called City. Collectively, Contractor and City shall be referred to as Parties.

WITNESSETH

WHEREAS, a Contract for Construction Project Name has recently been awarded to Contractor by City for $ - TBD 00,000.00, a sum equal to the aggregate cost of the work to be done and for labor, materials, equipment, apparatus, and supplies furnished at the prices and rates respectively named in the Proposal/Bid attached herewith as Exhibit 1;

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AND WHEREAS, it was provided in said Award that a formal contract would be executed by and between Contractor and City, evidencing the terms of said Award, and agreement on a date to be specified in a written order of City and would complete all work as outlined under Special Provisions and Standard Specifications (Exhibit 2) and would complete all work as required within the schedule as shown in the Special Provisions.

NOW, THEREFORE, Contractor does hereby covenant and agree with City that it will faithfully perform and execute such work and furnish such labor, materials, equipment, apparatus and supplies, in accordance with each and every one of the conditions, covenants, stipulations, terms, and provisions contained in said Specifications and Provisions and in accordance with the Plans, at and for a sum equal to the aggregate cost of the work done and labor, materials, equipment, apparatus and supplies furnished at the prices and rates respectively named therefore in the proposal attached thereto, and will well and faithfully comply with and perform each and every obligation imposed upon it by said Plans and Specifications and the terms of said Award.

ARTICLE 1: PAYMENT OBLIGATIONS

Contractor shall promptly make payments to all persons supplying materials in the execution of the work and to all laborers and others employed thereon.

Contractor shall furnish with each pay application on City provided forms, beginning not later than the second application for payment, an affidavit certifying the total cost of materials and North Carolina Sales Tax paid on such materials which are included in the application for payment.

ARTICLE 2: CONTRACTOR RESPONSIBILITIES AND LIABILITY

2.1 Property Damage

Contractor shall be responsible for all damages to property of the City of Fayetteville, North Carolina, that may be consequent upon the normal procedure of its work or that may be caused by or result from the negligence of Contractor, its employees or agents, during the progress of or connected with the execution of the work, whether within the limits of the work or elsewhere. Contractor must restore all property so injured to a condition as good as it was when Contractor entered upon the work.

2.2 General Liability

Contractor shall furthermore be responsible for and required to make good at its expense any and all damages of whatever nature to persons or property arising during the period of the Contract, caused by carelessness, neglect, or want of due precaution on the part of Contractor, its agents, employees or workmen.

2.3 Indemnification

To the extent permitted by law, Contractor shall indemnify and save harmless the City of Fayetteville, North Carolina, and the officers and agents thereof from all claims, suits, and proceedings of every name and description which may be brought against the City of Fayetteville, North Carolina, or the officers and agents thereof, for or on account of any injuries or damages to persons or property received or sustained by any person or persons, firm or corporation, or by or

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in consequence of any materials used in said work or by or on account of any improper material or workmanship in its construction, or by or on account of any accident, or of any other act or omission of Contractor, its agents, employees, servants or workmen.

Contractor assumes entire responsibility and liability for losses, expenses, demands and claims in connection with or arising out of any injury, or alleged injury (including death) to any person, or damage, or alleged damage, to property of the City or others sustained or alleged to have been sustained in connection with or to have arisen out of or resulting from the negligence of the Contractor, its subcontractors, agents, and employees, in the performance of the work/service set forth in the Standard Specifications and Special Provisions, and any changes, addenda, or modifications including losses, expenses or damages sustained by the City, and agrees to indemnify and hold harmless the City, its officials, employees or volunteers from any and all such losses, expenses, damages, demands and claims and agrees to defend any suit or action brought against them, or any of them, based on any such alleged injury or damage, and to pay all damages, cost and expenses in connection therewith or resulting therefrom.

Indemnification by the Contractor does not constitute a waiver of the City's governmental immunity in any respect under North Carolina law.

Consistent with N.C. Gen. Stat. § 22B-1(d), Contractor's indemnification obligation under this Section includes attorneys' fees, litigation and arbitration expenses, and court costs actually incurred by the City to defend against third-party claims asserted in any court, tribunal, or alternative dispute resolution proceeding required of the City by law or by contract, where the fault of Contractor or its derivative parties is a proximate cause of those fees, expenses, or costs.

Notwithstanding the foregoing, and pursuant to N.C. Gen. Stat. § 22B-1, Contractor's indemnification obligations under this Section shall not extend to liability for damages arising out of bodily injury to persons or damage to property proximately caused by or resulting from the negligence, in whole or in part, of the City, its independent contractors, agents, employees, or indemnitees, and shall apply only to the extent the fault of Contractor or its derivative parties is a proximate cause of the loss, damage, or expense indemnified.

2.4 Subcontracts and Contingent Assignment

2.4.1 Subcontractual Relations and Flow-Down

(a) By appropriate written agreement, Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to Contractor by the terms of the Contract Documents and to assume toward Contractor all obligations and responsibilities, including responsibility for safety, that Contractor assumes toward City under the Contract Documents. Each subcontract agreement shall preserve and protect City's rights under the Contract Documents with respect to the Work to be performed by the Subcontractor. Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors.

(b) All subcontracts shall include substantially the following provisions:

1. Flow-Down of Terms. To the extent of the work to be performed by Subcontractor: (A) Subcontractor is bound to Contractor by the terms of the Contract between City and Contractor, and (B) Subcontractor assumes toward Contractor all obligations and

responsibilities that Contractor assumes toward City under the Contract. City's rights under the Contract with respect to the Work to be performed by Subcontractor are preserved and protected. City is an intended third-party beneficiary of this subcontract.

2. Obligation to Continue Performance. If Contractor is terminated by City, and even if Contractor defaults in a manner that would give Subcontractor the right to terminate this subcontract, Subcontractor agrees that upon written request by City, a substitute contractor, or any surety obligated under bonds relating to the Contract, Subcontractor will continue to perform its obligations under this subcontract on the same terms and conditions for and on account of City, such substitute contractor, or the surety. If requested, Subcontractor will execute a separate document evidencing this commitment. Assignment is subject to the prior rights of the surety. City shall be responsible to Subcontractor only for those obligations of Contractor that accrue after City exercises rights under this provision.

2.4.2 Contingent Assignment of Subcontracts

(a) Assignment to City. Each subcontract agreement for a portion of the Work is hereby assigned by Contractor to City, subject to the following conditions:

1. Effectiveness. Assignment becomes effective only upon: a) Termination of this Contract by City for cause pursuant to 23.2; and b) City's written acceptance of the specific subcontract(s) by notice to Contractor and the affected Subcontractor(s).

2. Surety Priority. Assignment is subject to the prior rights of any surety obligated under payment and performance bonds provided pursuant to N.C. Gen. Stat. § 44A-26.

(b) City's Rights Upon Assignment. Upon accepting assignment of a subcontract, City assumes Contractor's rights and obligations under that subcontract. City may further assign the subcontract to a successor contractor but shall remain legally responsible for the successor contractor's obligations.

(c) Equitable Adjustment. If work under an assigned subcontract has been suspended for more than thirty (30) days following Contract termination, the Subcontractor's compensation shall be equitably adjusted for any increase in direct costs resulting from the suspension.

(d) Production of Subcontract Documents. Upon City's request at any time, Contractor shall promptly provide complete copies of all subcontract agreements, purchase orders, and related documents, including all terms, conditions, pricing, and delivery schedules.

2.5 Royalties, Licenses, and Patents

Contractor shall pay all royalties and license fees required on account of patented articles, materials, or processes used in the Work, whether or not the patent rights are evidenced in the Contract Documents. Contractor shall promptly notify the City in writing of any claim of patent infringement arising in connection with the Work. Contractor shall defend, indemnify, and hold harmless the City, its officials, employees, and volunteers from any claim, suit, loss, or expense arising out of infringement of any patent, copyright, trademark, or other intellectual property right by reason of the Work, except to the extent the infringement arises from a particular design, process, or product specified by the City.

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ARTICLE 3: CONTRACTOR LICENSES, PERMITS, AND REGULATORY COMPLIANCE

3.1 North Carolina General Contractor License

Contractor warrants and certifies that it possesses a valid and current North Carolina General Contractor License issued by the North Carolina Licensing Board for General Contractors (NCLBGC) as required by N.C. Gen. Stat. § 87-1 et seq.

3.1.1 License Classification

Contractor's license classification is: Building Contractor (Building Contractor / Residential Contractor / Specialty Contractor / Highway Contractor / Public Utilities Contractor)

3.1.2 License Limitation

Contractor's license limitation is: TBD - Verify (Limited / Intermediate / Unlimited)

- Limited License: Projects up to $750,000
- Intermediate License: Projects up to $1,500,000
- Unlimited License: No monetary restrictions

Contractor certifies that the contract amount does not exceed the monetary limitation of its license.

3.1.3 License Number and Qualifier

- North Carolina General Contractor License Number: TBD – L.0000
- Qualifying Party Name: Full Name of Individual
- Qualifier License Number: TBD - Q.0000

3.1.4 Maintenance of License

Contractor shall maintain its General Contractor License in good standing throughout the duration of this Contract. Contractor shall immediately notify the City of any suspension, revocation, or limitation placed on its license. Failure to maintain a valid license shall constitute a material breach of this Contract and grounds for immediate termination.

3.2 Specialty Trade Licenses

In addition to the General Contractor License, Contractor shall ensure that all work requiring specialty trade licenses is performed by properly licensed contractors, including but not limited to:

(a) Electrical Work: All electrical work shall be performed by contractors licensed by the North Carolina Board of Examiners of Electrical Contractors;

(b) Plumbing, Heating, and Fire Sprinkler Work: All plumbing, HVAC, and fire sprinkler work shall be performed by contractors licensed by the North Carolina State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors;

(c) Other Specialty Contractors: All other specialty work shall be performed by appropriately licensed contractors as required by North Carolina law.

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3.3 Corporate Registration Requirements

If Contractor is a corporation, Contractor certifies compliance with the following:

(a) In-State Corporations: Contractor has provided proof of registration via Articles of Incorporation filed with the North Carolina Secretary of State;

(b) Out-of-State Corporations: Contractor has obtained and provided a Certificate of Authority from the Corporations Division of the NC Secretary of State to transact business in North Carolina;

(c) Annual Reports: Contractor agrees to maintain current corporate status by filing annual reports with the North Carolina Secretary of State as required by law.

3.4 Building Permits and Inspections

3.4.1 Permit Responsibility

Contractor shall obtain and pay for all building permits, trade permits, and other permits required by local, state, and federal authorities having jurisdiction over the work. Contractor shall not commence work until all required permits have been obtained and posted at the work site.

3.4.2 Permit Posting

All permits shall be prominently displayed at the work site and shall remain posted throughout the duration of construction.

3.4.3 Inspection Scheduling

Contractor shall schedule all required inspections with the appropriate authorities in a timely manner to avoid delays in the work. Contractor shall be present or have a qualified representative present for all inspections.

3.4.4 Compliance with Code Requirements

All work shall comply with:

- North Carolina State Building Code
- North Carolina Residential Building Code (if applicable)
- All applicable local building codes and ordinances
- All applicable federal regulations

3.4.5 Certificate of Occupancy

Contractor shall obtain all required Certificates of Occupancy or Certificates of Completion from the appropriate authorities prior to requesting Final Completion under this Contract.

3.5 Professional Registration

Any design work, engineering work, or professional services required under this Contract shall be performed only by individuals or firms holding current registration/licensure with the appropriate North Carolina professional licensing boards, including:

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- North Carolina Board of Architecture
- North Carolina Board of Examiners for Engineers and Surveyors
- Other applicable professional boards

3.6 Federal and State Tax Compliance

Contractor certifies that it is current on all federal and state tax obligations and shall remain current throughout the duration of this Contract. Contractor shall provide evidence of tax compliance upon request by the City.

3.7 Compliance with OSHA and Safety Requirements

Contractor shall comply with all applicable Occupational Safety and Health Administration (OSHA) regulations and North Carolina Department of Labor safety requirements. Contractor shall maintain all required safety programs and documentation.

3.8 Environmental Permits

Contractor shall obtain all required environmental permits, including but not limited to:

- Stormwater permits (NPDES)
- Erosion and sediment control permits
- Air quality permits
- Wetlands permits
- Any other environmental permits required by federal, state, or local authorities

3.9 Right to Verify

The City reserves the right to verify all licenses, permits, registrations, and certifications required under this Article. Failure to maintain any required license, permit, or certification shall constitute a material breach of this Contract.

3.10 Costs

All costs associated with obtaining and maintaining licenses, permits, registrations, and certifications required under this Article shall be borne solely by Contractor and are deemed included in the Contract amount.

ARTICLE 4: INSURANCE REQUIREMENTS

At all times during performance of services under this Contract, Contractor agrees to purchase and maintain the following insurance policies:

No insurance required under this Article, and no act of Contractor in procuring such insurance, shall be deemed a contract of insurance purchased by the City or a waiver of the City's governmental immunity under N.C. Gen. Stat. § 160A-485.

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4.1 Commercial General Liability Insurance

Commercial General Liability Insurance with combined single limits of $1,000,000.00 coverage for each occurrence with a general aggregate of $2,000,000.00, designating the City as an additional insured and which said insurance provides Contractor with insurance for contractual liability which Contractor has assumed pursuant to the terms of this Agreement. Said insurance coverage shall be underwritten by an insurance company authorized to do business in the State of North Carolina by the North Carolina Department of Insurance, with an A.M. Best rating of either Superior (A++ or A+) or Excellent (A or A-).

4.2 Automobile Liability Insurance

Automobile liability insurance with $1,000,000.00 combined single limit for each accident covering bodily injury and property damage.

4.3 Worker's Compensation Insurance

Worker's Compensation Insurance as provided by North Carolina law which said policy shall also afford coverage to Contractor for employer's liability. Contractor shall provide adequate coverage for the protection of employees not otherwise protected by a worker's compensation policy.

4.4 Contractual Liability Insurance

As an integral part of this Agreement, Contractor agrees to purchase and maintain during the life of this Agreement contractual liability insurance in the amount required in the general liability insurance requirements and to furnish proper evidence thereof.

4.5 Builder's Risk Insurance

Unless otherwise specified in the solicitation or Contract Documents, the Contractor shall procure and maintain Builder's Risk insurance when required by the City. Builder's Risk shall be required for new construction, building additions or expansions, major renovations, and other projects where the City determines there is a significant risk of loss or damage to the Work. For minor renovations, repairs, routine maintenance, demolition-only work, or other lower-risk activities, Builder's Risk shall be required only when specifically identified by the City.

4.5.1 Coverage Amount. When Builder's Risk is required, coverage shall be written on a replacement-cost basis in an amount equal to one hundred percent (100%) of the full replacement value of the Work, unless a different amount is stated in the Contract Documents or approved in writing by the City.

4.5.2 Coverage Form and Property Covered. Coverage shall be written on a Special Form (all-risk) basis, subject to standard market exclusions, and shall include the Work in progress and materials and equipment intended for incorporation into the Work. Coverage shall apply, as applicable, while covered property is located at the Project site, temporarily stored off-site, or in transit.

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4.5.3 Insurance Carrier Rating. Builder's Risk insurance shall be provided by an insurance carrier with a minimum A rating.

4.5.4 Additional Perils and Project-Specific Coverage. Coverage shall include flood, windstorm, water intrusion, and temporary structures, earthquake, and earth movement, where commercially available. The City reserves the right to require soft-cost, delay-in-completion, or other project-specific coverage when warranted by the Project's size, location, financing, operational requirements, or risk characteristics.

4.5.5 Existing City-Owned Structures. For renovations or additions involving an existing City-owned structure, the City shall determine whether existing-property coverage is required. If required, the minimum limit shall be equal to the estimated replacement value of the affected structure or such other amount stated in the Contract Documents.

4.5.6 Insured Parties. The City, Contractor, and applicable subcontractors shall be included as Named Insureds, Additional Named Insureds, or Loss Payees, as appropriate to the policy form and the respective interests of the parties.

4.5.7 Deductibles. The Contractor shall be responsible for applicable deductibles unless otherwise stated in the Contract Documents. Deductibles exceeding $25,000, or another amount established by the City, shall require prior written approval by the City.

4.5.8 Waiver of Subrogation. A waiver of subrogation in favor of the City shall be provided to the extent available and permitted by the applicable policy.

4.5.9 Evidence and Duration of Coverage. Evidence of Builder's Risk coverage shall be provided prior to commencement of Work or delivery of materials to the Project site. Coverage shall remain in effect until Substantial Completion and acceptance of the Work by the City, unless otherwise approved in writing by the City.

4.5.10 City Adjustment. The City reserves the right, based on the specific scope, value, location, and risk characteristics of a Project, to require Builder's Risk coverage where it would otherwise not be required, waive the requirement where appropriate, permit the City or another party to place the coverage, or establish additional or different coverage requirements in the solicitation or Contract Documents.

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ARTICLE 5: PAYMENT AND PERFORMANCE BONDS

5.1 Bond Requirements Pursuant to N.C. Gen. Stat. § 44A-26

When the total amount of construction contracts awarded for any one project exceeds three hundred thousand dollars ($300,000), Contractor shall furnish to the City, as required by North Carolina General Statutes § 44A-26, the following bonds for any contract exceeding fifty thousand dollars ($50,000):

5.1.1 Performance Bond

A performance bond in the amount of one hundred percent (100%) of the construction contract amount, conditioned upon the faithful performance of the contract in accordance with the plans, specifications, and the terms of this Contract. The performance bond shall be for the protection of the City and shall secure the faithful performance of all duties and obligations of Contractor under this Contract.

5.1.2 Payment Bond

A payment bond in the amount of one hundred percent (100%) of the construction contract amount, conditioned upon the prompt payment for all labor or materials for which Contractor or subcontractor is liable. The payment bond shall be solely for the protection of the persons furnishing materials or performing labor for which Contractor, subcontractor, or construction manager at risk is liable.

5.1.3 In the discretion of the City, performance and payment bonds may be required on construction contracts below the statutory threshold amounts.

5.2 Surety Requirements

The performance bond and the payment bond shall be executed by one or more surety companies legally authorized to do business in the State of North Carolina and shall become effective upon the awarding of the construction contract. All surety companies shall maintain an A.M. Best rating of either Superior (A++ or A+) or Excellent (A or A-).

5.3 Bond Forms

The payment and performance bonds required under this Contract shall follow the forms established under N.C. Gen. Stat. § 44A-33, or such other forms as may be approved in writing by the City. Bond Forms are attached as Exhibit 3.

5.4 Certified Copies of Bonds

It shall be the duty of the City to provide any person entitled thereto under N.C. Gen. Stat. § 44A-31 with a certified copy of the payment bond and the construction contract upon not less than ten (10) days' notice and request. The City may require a reasonable payment for the actual cost of furnishing the certified copy.

5.5 Contractor's Duty to Provide Bond Copies

Contractor shall furnish a copy of the payment bond to any claimant within seven (7) days of receipt of a written request, as required by N.C. Gen. Stat. § 44A-27(b). Failure to furnish the bond

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as requested shall suspend the obligation of the subcontractor to furnish the Notice of Public Subcontract until the request is complied with.

5.6 Incorporation of Contract Documents

It is agreed and understood that the Invitation for Bids, Proposal, Standard Specifications, Special Provisions, and the enumerated addenda and drawings are parts and parcels of this Contract to the same extent as if incorporated herein in full.

5.7 Additional Security

It is further mutually agreed that if at any time after the execution of this agreement and the surety bonds hereto attached for its faithful performance, City shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover performance and payment of the work, Contractor shall, at its expense, within five (5) days after the receipt of notice from the City so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to City. In such event, no further payment to Contractor shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to City.

ARTICLE 6: TIME OF COMPLETION AND LIQUIDATED DAMAGES

6.1 Contract Time

Contractor agrees to commence work under this Contract on the date specified in the Notice to Proceed issued by the City and to complete all work within [TBD] calendar days from the date specified in the Notice to Proceed.

Time is of the essence in the performance of this Contract.

6.2 Substantial Completion

Substantial Completion shall mean the stage in the progress of the work when the work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the City can occupy or utilize the work for its intended use. The date of Substantial Completion shall be established by the City in the Certificate of Substantial Completion and, where applicable, supported by a Temporary Certificate of Occupancy (TCO).

6.3 Liquidated Damages for Delay

The parties acknowledge and agree that:

(a) The actual damages that the City will sustain in the event of delay in completion of the work are difficult to ascertain with certainty at the time of entering into this Contract;

(b) The liquidated damages amount set forth herein represents a reasonable estimate of the damages which would probably be caused by breach of the completion deadline and are not intended as a penalty; and

(c) The liquidated damages include but are not limited to costs associated with extended project administration, extended oversight and inspection services, delay in availability of

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facilities for public use, and other consequential damages reasonably anticipated from delayed completion.

Accordingly, if Contractor fails to achieve Substantial Completion of the work within the time specified in Section 6.1, or within such extended time as may be granted pursuant to Section 6.5, Contractor shall pay to the City, not as a penalty but as liquidated damages for breach of contract, the sum stated in this Contract as the Liquidated Damages — Delay rate for each calendar day that Substantial Completion is delayed beyond the required completion date.

6.3.1 Liquidated Damages for Unauthorized Suspension of the Work

If Contractor suspends or discontinues prosecution of the Work, in whole or in part, without the prior written authorization of the City, and other than a suspension directed by the City under Article 21 or excused under Section 6.5, Contractor shall pay to the City, not as a penalty but as liquidated damages for breach of contract, the sum stated in this Contract as the Liquidated Damages — Unauthorized Suspension rate for each calendar day the unauthorized suspension continues, beginning on the first calendar day of the suspension and continuing until Contractor resumes diligent prosecution of the Work.

The acknowledgments in subsections (a) through (c) of Section 6.3 apply equally to liquidated damages assessed under this Section. Liquidated damages assessed under this Section are separate from and in addition to liquidated damages assessed under Section 6.3; provided, however, that the City shall not assess liquidated damages under both Sections for the same calendar day. Assessment of liquidated damages under this Section does not waive, limit, or otherwise affect the City's right to terminate this Contract for cause under Section 23.2 or to pursue any other remedy available at law or in equity.

6.4 Deduction of Liquidated Damages

The City may deduct the amount of liquidated damages from any amounts due or to become due to Contractor under this Contract. The City's right to assess and collect liquidated damages shall not be exclusive and shall be in addition to any other rights or remedies available to the City under this Contract or at law.

6.5 Extensions of Time

Contractor shall be entitled to an extension of the Contract Time for delays in completion of the work caused by:

(a) Acts or omissions of the City or its agents, employees, or separate contractors;

(b) Changes in the work ordered by the City;

(c) Unusually severe weather conditions not reasonably anticipated;

(d) Force majeure events as defined in Section 28.2;

(e) Delays caused by labor disputes beyond Contractor's control;

(f) Delays caused by fire, flooding, epidemics, quarantine restrictions, or acts of government;

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(g) Any other causes beyond the reasonable control of Contractor and not attributable to Contractor's fault or negligence.

6.6 Procedure for Requesting Time Extensions

Contractor shall submit a written request for extension of time to the City within ten (10) calendar days after the occurrence of the event causing the delay. The request shall include:

(a) A description of the cause of delay;

(b) The date the delay commenced and the anticipated duration;

(c) Documentation supporting the claim that the delay was beyond Contractor's reasonable control;

(d) The number of days of extension requested;

(e) Any supporting documentation, including contemporaneous records, schedules, and correspondence.

Failure to provide timely notice as required herein may result in waiver of the claim for time extension, unless the City determines that circumstances prevented timely notice.

6.7 Apportionment of Delays

In the event that delays to project completion are caused by both the City and Contractor (concurrent or mutual delays), liquidated damages shall be apportioned between the parties based upon their respective degrees of responsibility for the delays. The burden of proving the extent and allocation of concurrent delays shall rest with Contractor. This apportionment provision is essential to the enforceability of the liquidated damages clause and is included in accordance with North Carolina law.

6.8 No Waiver

The City's failure to assess liquidated damages for any period of delay shall not constitute a waiver of the City's right to assess liquidated damages for any other period of delay or for continued delays.

6.9 Final Completion

Final Completion shall occur when all work under the Contract is fully completed in accordance with the Contract Documents, all required documentation has been submitted, all punch list items have been completed, and the City has accepted the work as complete. Additional liquidated damages may be assessed for delays in achieving Final Completion beyond any extended deadlines, at a rate to be specified in the Special Provisions.

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ARTICLE 7: RESERVED

ARTICLE 8: NON-DISCRIMINATION

It is further agreed that Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, or disability, and shall comply with Title VII of the Civil Rights Act of 1964 (42 U.S.C. § 2000e et seq.), the Age Discrimination in Employment Act (29 U.S.C. § 621 et seq.), the Americans with Disabilities Act (42 U.S.C. § 12101 et seq.), and the North Carolina Persons with Disabilities Protection Act, N.C. Gen. Stat. Chapter 168A.

8.1 Terminating Illegal Discrimination Certification (For Federally Funded Projects Only)

Contractor certifies that: (i) it does not operate any DEI programs that violate any applicable Federal anti-discrimination laws, (ii) it is compliant in all respects with all applicable Federal anti-discrimination laws material to the government's payment decisions, and (iii) agrees that, if a violation of this certification is found, could lead to liability under the False Claims Act. By signing this Agreement, Contractor further agrees, as an independent obligation, separate and apart from this Agreement, to reimburse the City for any and all damages, costs and attorneys' fees incurred by the City in connection with any claim that this Agreement or any part thereof is void due to Contractor's noncompliance with this certification at any time before or during the term of this Agreement.

ARTICLE 9: CHANGE ORDERS AND CONTRACT MODIFICATIONS

9.1 Authority to Order Changes

The City reserves the right to order changes in the work without invalidating this Contract. Changes in the work may include additions, deletions, or other revisions to the work, with the Contract Sum and Contract Time being adjusted accordingly.

9.2 Change Order Procedure

9.2.1 Written Authorization Required

No changes to the work shall be made unless authorized by a written Change Order Request Form signed by the City. Contractor shall not proceed with any change in the work without such written authorization. Any work performed without a fully executed Change Order Request Form shall be at Contractor's sole risk and expense.

9.2.2 Change Order Request

Contractor shall submit a Change Order Request Form within ten (10) calendar days of being directed to perform changed work or within ten (10) calendar days of discovering conditions requiring a change. The request shall include:

(a) Detailed description of the proposed change;

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(b) Itemized cost breakdown including labor, materials, equipment, and overhead;

(c) Impact on project schedule;

(d) Supporting documentation (quotes, invoices, time records, etc.); and,

(e) Justification for the change.

9.2.3 Pricing of Changes

Changes in the work shall be priced using one or more of the following methods, in order of preference:

(a) Lump Sum: A mutually agreed upon fixed price for the changed work;

(b) Unit Prices: Application of unit prices specified in the Contract Documents or as mutually agreed upon;

(c) Cost Plus: Actual costs plus a markup not to exceed fifteen percent (15%) for overhead and profit. Actual costs shall be substantiated by documentation satisfactory to the City and shall include:

- Labor costs (actual wages plus burden)
- Materials (at actual invoice cost)
- Equipment (at reasonable rental rates)
- Subcontractor costs (plus maximum 10% markup by Contractor)

9.2.4 Markup Limitations

Maximum markups on Change Orders shall be:

- Contractor's own work: 15% for overhead and profit combined
- Subcontractor work: Subcontractor may markup 15%; Contractor may add maximum 10% on subcontractor's cost
- No markup shall be applied to sales tax, permits, fees, or City-designated allowance items

9.2.5 Time Extensions

If a Change Order affects the Contract Time, Contractor must request a time extension in writing with supporting documentation showing critical path impact. Time extensions shall be granted only for delays to critical path activities.

9.3 Minor Changes

The City may authorize minor changes in the work that do not involve a change in the Contract Sum or Contract Time through written directive. Contractor shall proceed promptly with such minor changes.

9.4 Construction Change Directives

If the City and Contractor cannot agree on pricing or time for a change, the City may issue a Construction Change Directive ordering Contractor to proceed with the changed work. Contractor

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shall proceed promptly, and the Change Order shall be resolved through one of the pricing methods in Section 9.2.3.

9.5 Concealed or Unknown Conditions

If Contractor encounters concealed or unknown conditions at the site materially differing from those indicated in the Contract Documents or from those ordinarily encountered in work of this nature, Contractor shall immediately notify the City in writing before disturbing the condition. Failure to provide timely notice may result in waiver of any claim for additional compensation.

9.6 Claims for Additional Cost

Any claim for additional cost must be submitted in writing within ten (10) calendar days after occurrence of the event giving rise to the claim. Claims submitted after ten (10) days may be denied as untimely. Each claim shall include detailed supporting documentation.

9.7 No Oral Modifications

No oral statements, representations, or agreements shall modify or change any provision of this Contract. All modifications must be in writing and signed by authorized representatives of both parties.

ARTICLE 10: PROVISIONS

10.1 Schedule of Values

Within fifteen (15) days of Contract execution, Contractor shall submit a Schedule of Values allocating the entire Contract Sum among the various portions of the work. The Schedule of Values shall be in a form acceptable to the City and shall serve as the basis for monthly progress payments.

10.2 Monthly Payment Applications

10.2.1 Submission Requirements

Contractor shall submit monthly Applications for Payment on City-approved forms by the 21st day of each month for work completed through the last day of the previous month.

Each Application for Payment shall include:

(a) Updated Schedule of Values showing percentage complete for each line item;

(b) NC Sales Tax Affidavit certifying sales tax paid on materials;

(c) Copies of paid invoices for materials stored on-site;

(d) Waivers of lien from subcontractors and suppliers, limited in each case to the specific interim or progress payment actually received in exchange for the waiver, as required by N.C. Gen. Stat. § 22B-5;

(e) DBE/SBE utilization report (if applicable);

(f) Payroll certifications (if federal funding requires);

(g) Updated project schedule; and,

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(h) Any other documentation required by the City.

10.2.2 Stored Materials

Materials suitably stored on-site may be included in progress payments if:

(a) Materials are properly stored and protected;

(b) Contractor provides proof of payment to supplier;

(c) Contractor provides evidence of insurance covering stored materials;

(d) City approves inclusion in advance.

Materials stored off-site shall not be eligible for payment unless specifically approved in writing by the City.

10.3 Retainage

10.3.1 Standard Retainage

Retainage shall be withheld and released in accordance with N.C. Gen. Stat. § 143-134.1. No retainage shall be withheld on any project with total project costs of less than one hundred fifty thousand dollars ($150,000). On any project with total project costs equal to or greater than one hundred fifty thousand dollars ($150,000), the City may retain not more than five percent (5%) of any periodic payment due Contractor.

10.3.2 Reduction of Retainage

When the project is fifty percent (50%) complete, the City, with the written consent of the surety, shall withhold no further retainage from periodic payments due Contractor, provided Contractor continues to perform satisfactorily and any nonconforming work identified in writing prior to that time has been corrected by Contractor and accepted by the City. If the City determines Contractor's performance is unsatisfactory, the City may reinstate retainage on subsequent periodic payment applications up to five percent (5%). The project shall be deemed fifty percent (50%) complete as provided in N.C. Gen. Stat. § 143-134.1(b1)(2). Following fifty percent (50%) completion, the City may withhold additional retainage from a subsequent periodic payment, not to exceed five percent (5%), in order to hold two and one-half percent (2.5%) total retainage through completion of the project, as provided in N.C. Gen. Stat. § 143-134.1(b3).

10.3.3 Release of Retainage Upon Substantial Completion

Within sixty (60) days after submission of a pay request and the City's receipt of a certificate of substantial completion from the architect, engineer, or designer in charge of the project, or the City's beneficial occupancy or use of the project, whichever is specified in the Contract Documents, the City, with the written consent of the surety, shall release all retainage held. The City may retain sufficient funds to secure completion of the project or correction of any work, provided the amount retained shall not exceed two and one-half (2.5) times the estimated value of the work to be completed or corrected. Neither the existence of third-party claims against Contractor nor any additive change order shall be a basis for delaying release of retainage.

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10.3.4 Subcontractor Retainage

Contractor shall return retainage to subcontractors under the same terms and conditions applicable to the City's release of retainage to Contractor, and in no event later than thirty (30) days after the subcontractor's work is completed and accepted, unless there are specific documented reasons for withholding retainage permitted by N.C. Gen. Stat. § 143-134.1(d). The percentage of retainage withheld by Contractor from any subcontractor shall not exceed the percentage of retainage withheld by the City from Contractor, except as permitted by N.C. Gen. Stat. § 143-134.1(b3).

10.4 Payment Timeline

The City shall make periodic payments in accordance with the payment provisions of the Contract Documents. Pursuant to N.C. Gen. Stat. § 143-134.1(a), the balance due Contractor shall be paid in full within forty-five (45) days after this Contract has been accepted by the City, certified by the architect, engineer, or designer to be completed in accordance with the plans and specifications, or occupied by the City and used for the purpose for which the project was constructed, whichever occurs first. Payment shall constitute acceptance of the work covered by that payment application, subject to correction of defects discovered later and warranty obligations.

10.5 Withholding of Payment

The City may withhold or nullify payment, in whole or in part, to the extent necessary to protect itself from loss due to:

(a) Defective work not remedied;

(b) Claims filed or reasonable evidence that claims will be filed;

(c) Failure to make payments to subcontractors or suppliers;

(d) Reasonable doubt that the Contract can be completed for the unpaid balance;

(e) Damage to the City or another contractor;

(f) Reasonable evidence that work cannot be completed within Contract Time;

(g) Repeated failure to carry out work in accordance with Contract Documents;

(h) Failure to submit required documentation or reports;

(i) Non-compliance with DBE/SBE requirements (if applicable);

(j) Any other material breach of Contract.

10.6 Final Payment

10.6.1 Final Payment Application

Upon completion of all work, Contractor shall submit a final Application for Payment including:

(a) Final Schedule of Values showing 100% completion;

(b) Complete waivers of lien from all subcontractors and suppliers;

(c) Final NC Sales Tax Affidavit;

(d) Final DBE/SBE utilization report (if applicable);

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(e) All warranties and guarantees;

(f) As-built drawings and O&M manuals;

(g) Certificates of Occupancy and all required permits;

(h) Consent of surety to final payment;

(i) Affidavit that all payrolls, materials, and other indebtedness have been paid;

(j) Any other closeout documentation required.

10.6.2 Final Payment Processing

Final payment shall be made within forty-five (45) days after completion of all work and receipt of all required documentation. Acceptance of final payment shall constitute a waiver of all claims by Contractor except those previously made in writing and still unsettled.

10.7 Interest on Late Payments

Pursuant to N.C. Gen. Stat. § 143-134.1(a), if final payment is delayed by more than forty-five (45) days beyond the date determined under Section 10.4 and through no fault of Contractor, the City shall pay interest beginning on the forty-sixth (46th) day at the rate of one percent (1%) per month or fraction thereof on the unpaid balance. Interest on any delayed periodic payment shall accrue at the same rate as provided in N.C. Gen. Stat. § 143-134.1(a). Where a conditional acceptance of this Contract exists and the City is retaining a reasonable sum pending correction of the conditions, interest on the reasonable sum shall not apply.

10.8 Prompt Payment to Subcontractors

Pursuant to N.C. Gen. Stat. § 143-134.1(b), Contractor shall pay each subcontractor within seven (7) days of receipt by Contractor of each periodic or final payment, based on work completed or service provided under the subcontract. If payment to the subcontractor is delayed by more than seven (7) days, Contractor shall pay the subcontractor interest, beginning on the eighth (8th) day, at the rate of one percent (1%) per month or fraction thereof on the unpaid balance. Failure to make prompt payment may result in withholding of future payments to Contractor.

ARTICLE 11: PROJECT SCHEDULE AND TIME MANAGEMENT

11.1 Construction Schedule Submission

Within fifteen (15) days of receiving Notice to Proceed, Contractor shall submit a detailed construction schedule in Critical Path Method (CPM) format showing:

(a) All activities necessary to complete the work;

(b) Sequential relationships and dependencies;

(c) Duration of each activity;

(d) Critical path through the project;

(e) Major milestones and completion dates;

(f) Long-lead procurement items;

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(g) Required submittals and shop drawing dates;

(h) Coordination with other contractors or occupants (if applicable).

11.2 Schedule Format and Software

The schedule shall be prepared using industry-standard scheduling software (Primavera P6, Microsoft Project, or as approved by City) and submitted in both electronic and hard copy formats.

11.3 Schedule Updates

Contractor shall submit updated schedules monthly with each Application for Payment, showing:

(a) Progress achieved to date;

(b) Changes to sequencing or logic;

(c) Impact of any delays;

(d) Recovery plans for behind-schedule activities;

(e) Revised completion date if different from Contract Time.

11.4 Schedule Review and Approval

The City's review and approval of the schedule does not relieve Contractor of responsibility for completing work within the Contract Time. Schedule approval does not constitute acceptance of means, methods, or sequences of construction.

11.5 Recovery Schedule

If at any time Contractor falls behind schedule, Contractor shall submit a recovery schedule showing how Contractor will complete the work within the Contract Time. Recovery measures shall be at Contractor's expense unless the delay was caused by the City.

11.6 Notice to Proceed

Contractor shall not commence work until receiving written Notice to Proceed from the City. The Contract Time shall commence on the date specified in the Notice to Proceed.

ARTICLE 12: SUBMITTALS, SHOP DRAWINGS, AND PRODUCT DATA

12.1 Submittal Requirements

Contractor shall submit shop drawings, product data, samples, and other submittals as required by the Contract Documents for review and approval before:

(a) Procuring materials;

(b) Fabricating components;

(c) Commencing any portion of work requiring submittals.

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12.2 Submittal Schedule

Contractor shall submit a Submittal Schedule within fifteen (15) days of Contract execution, coordinated with the construction schedule, showing:

(a) Each required submittal;

(b) Anticipated submission date;

(c) Required review time;

(d) Impact on construction schedule.

12.3 Submittal Procedures

12.3.1 Format and Content

All submittals shall:

(a) Be clearly marked with project name, submittal number, and specification section;

(b) Highlight deviations from Contract Documents;

(c) Include manufacturer's data and certifications;

(d) Be submitted in the quantity specified (typically 3 copies plus electronic);

(e) Include Contractor's stamp of review and approval.

12.3.2 Review Time

The City shall be allowed fifteen (15) business days for review of submittals unless a different time is specified. Review time shall be calculated from receipt of properly formatted submittals.

12.3.3 Resubmittals

If submittals are rejected or require revision, Contractor shall make corrections and resubmit within ten (10) days. Each resubmittal restarts the review period.

12.4 City Review

City review of submittals is for general conformance with design concept only. Review does not:

(a) Relieve Contractor of responsibility for errors or omissions;

(b) Constitute approval of means, methods, or safety procedures;

(c) Relieve Contractor of responsibility for dimensions or quantities;

(d) Constitute acceptance of deviations unless specifically noted in writing.

12.5 Samples

When required, Contractor shall submit samples for City approval before purchasing or installing materials. Approved samples shall be retained at the site for comparison with installed work.

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12.6 Submittals for Information Only

Certain submittals may be designated "For Information Only" and do not require formal approval but must still be submitted per the schedule.

ARTICLE 13: SITE MANAGEMENT AND WORKING CONDITIONS

13.1 Site Access and Control

13.1.1 Site Possession

Upon issuance of Notice to Proceed, Contractor shall have full possession of the site except for portions specifically excluded in the Contract Documents. The City reserves the right to occupy portions of the work during construction.

13.1.2 Site Security

Contractor shall:

(a) Maintain site security to prevent unauthorized access;

(b) Provide temporary fencing if required;

(c) Be responsible for loss or damage to materials and equipment;

(d) Maintain control of all personnel on site.

13.2 Construction Signs

Contractor shall provide and maintain project signage as required by the City, including:

(a) Project identification signs per City specifications;

(b) Safety and warning signs as required by OSHA;

(c) Traffic control signs as required by permits;

(d) "No Trespassing" signs if required.

13.3 Working Hours

13.3.1 Standard Hours

Normal working hours shall be Monday through Friday, 7:00 AM to 5:00 PM, unless otherwise specified or approved by the City.

13.3.2 After-Hours Work

Work outside normal hours, on weekends, or holidays requires prior written approval from the City. Contractor shall notify affected neighbors and coordinate with City police if required.

13.3.3 Noise Restrictions

Contractor shall comply with all local noise ordinances and minimize disturbance to neighboring properties and City operations.

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13.4 Parking and Staging

13.4.1 Construction Parking

Contractor shall provide adequate parking for all personnel, equipment, and vehicles. Parking on City streets or neighboring properties requires prior approval.

13.4.2 Staging Areas

Contractor shall confine operations to areas designated for storage and staging. Materials shall be stored in orderly fashion and shall not obstruct access or traffic.

13.4.3 Traffic Control

Contractor shall maintain traffic flow and pedestrian access as required. Traffic control plans require City approval before implementation.

13.4.4 Truck Routes

Contractor shall comply with all applicable City of Fayetteville requirements governing truck routes, construction traffic, and haul routes.

When construction traffic will utilize City streets, Contractor shall obtain any required City truck route permit and shall establish and use haul routes approved by the City prior to commencing applicable hauling or construction operations.

Contractor shall be responsible for ensuring that its subcontractors, suppliers, haulers, and equipment operators comply with the approved truck route and all applicable permit requirements.

Any proposed change to an approved truck route shall be submitted to the City for review and approval prior to implementation.

City truck route maps, permit requirements, and related information are available from the City of Fayetteville.

13.5 Site Conditions and Cleanliness

13.5.1 Daily Cleanup

Contractor shall maintain the site in clean, safe condition at all times. Debris and waste shall be removed from the site regularly and disposed of properly.

All debris must be maintained within site perimeter. Any debris, soil, etc., leaving the site must be cleaned immediately.

13.5.2 Final Cleanup

Before requesting Substantial Completion, Contractor shall:

(a) Remove all debris, rubbish, and waste materials;

(b) Clean all surfaces including windows, fixtures, and equipment;

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(c) Remove stains, marks, and dirt from all finished surfaces;

(d) Vacuum and clean all interior spaces;

(e) Leave the site in "broom clean" condition.

13.6 Protection of Existing Facilities

Contractor shall protect existing structures, utilities, vegetation, and improvements from damage. Any damage shall be repaired or replaced at Contractor's expense to the City's satisfaction.

13.7 Utility Coordination

13.7.1 NC 811 Requirements

Before commencing any excavation, Contractor shall:

(a) Contact NC 811 at least three (3) business days in advance;

(b) Mark proposed excavation areas with white paint;

(c) Maintain locate marks throughout construction;

(d) Re-notify if work extends beyond original locate dates.

13.7.2 Utility Protection

Contractor shall:

(a) Protect all existing utilities from damage;

(b) Support and maintain utilities during construction;

(c) Coordinate shutdowns with City and affected utility companies;

(d) Provide temporary utilities as needed;

(e) Immediately report any utility damage to City and utility owner.

13.7.3 Utility Damage

Contractor shall be responsible for all costs associated with repair of damaged utilities, including emergency repairs, service interruptions, and claims by third parties.

13.8 Public Convenience and Safety

Contractor shall conduct operations to minimize inconvenience to the public and shall:

(a) Maintain access to occupied buildings;

(b) Provide temporary walkways and barriers;

(c) Coordinate deliveries to minimize traffic impact;

(d) Provide flaggers for traffic control as needed;

(e) Maintain emergency vehicle access at all times.

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ARTICLE 14: QUALITY CONTROL AND TESTING

14.1 Quality Control Program

Contractor shall establish and maintain a quality control program to ensure all work complies with Contract Documents. The program shall include:

(a) Inspection procedures;

(b) Testing protocols;

(c) Documentation requirements;

(d) Corrective action procedures.

14.2 Testing and Inspections

14.2.1 Required Testing

Contractor shall perform all testing required by the Contract Documents, building codes, and regulatory agencies, including but not limited to:

(a) Concrete cylinder tests;

(b) Soil compaction tests;

(c) Structural steel inspections;

(d) Mechanical system testing and balancing;

(e) Electrical system testing;

(f) Fire alarm and sprinkler testing;

(g) Any other tests specified.

14.2.2 Testing Costs

All testing required by Contract Documents shall be at Contractor's expense. Retesting due to failures shall be at Contractor's expense.

14.2.3 Independent Testing Agencies

Testing shall be performed by independent testing agencies approved by the City. Contractor shall coordinate testing schedules and provide access.

14.2.4 Test Reports

Contractor shall submit copies of all test reports to the City within five (5) days of receipt. Failed tests shall be reported immediately.

14.3 Material Certifications

Contractor shall provide manufacturer's certifications for materials as required by specifications, including:

(a) Mill certifications for structural steel;

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(b) Manufacturer's data sheets;

(c) Fire ratings and listings;

(d) Energy efficiency ratings;

(e) Warranty documentation.

14.4 City Inspections

The City and its representatives shall have access to the work at all times for inspection. Contractor shall provide safe access and shall not cover any work required to be inspected until inspected and approved.

14.5 Defective Work

14.5.1 Correction of Defects

Work that does not conform to Contract Documents shall be considered defective. The City may require removal and replacement of defective work at Contractor's expense.

14.5.2 Rejection of Defective Work

The City may reject defective work and require: (a) Removal and replacement at Contractor's expense; (b) Repair to City's satisfaction; (c) Acceptance with adjustment in Contract Sum.

14.5.3 Uncovering of Work

If the City requests inspection of work already covered, Contractor shall uncover such work and properly restore it. If work is found to be defective, costs shall be borne by Contractor. If work is found to be acceptable, the City shall pay for uncovering and restoration by Change Order.

ARTICLE 15: WARRANTIES AND GUARANTEES

15.1 General Warranty

Contractor warrants that all work shall be:

(a) Free from defects in materials and workmanship;

(b) In accordance with Contract Documents;

(c) Performed in a good and workmanlike manner;

(d) In compliance with all applicable codes and regulations

15.1.1 Warranty Exclusions

Contractor’s warranty does not apply to defects or damage caused by abuse, misuse, improper operation, failure to perform routine maintenance, normal wear and tear, vandalism, acts of God, or work performed by others after Substantial Completion. This exclusion does not apply to defects resulting from Contractor’s defective Work, improper installation, or failure to comply with the Contract Documents.

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15.2 One-Year Warranty Period

Contractor shall correct any defects in materials or workmanship appearing within one (1) year from the date of Substantial Completion at no cost to the City. This warranty is in addition to any manufacturer warranties required under the Contract Documents.

15.2.1

For punch list items, deferred work, or any Work completed after Substantial Completion, the warranty period for that specific Work shall begin on the date the Work is completed and accepted by the City. Consistent with N.C. Gen. Stat. § 143-134.1(b4), no release of retainage on a line item of work shall cause any warranty period to begin earlier than the City's receipt of a certificate of substantial completion or the City's beneficial occupancy of the project.

15.3 Extended Warranties

Certain systems and components require extended warranties as specified in Contract Documents, including:

(a) Roofing systems (typically 10-20 years);

(b) HVAC equipment (typically 5-10 years);

(c) Other specialized systems as specified.

15.4 Warranty Claims

The City shall notify Contractor in writing of observed defects during the warranty period. Contractor shall respond within two (2) business days with a proposed plan and schedule for corrective action, shall commence corrective Work within seven (7) calendar days, and shall complete corrective Work within the timeframe directed by the City.

For defects that create a safety hazard, risk of property damage, or interruption of essential services, Contractor shall respond within twenty-four (24) hours and commence corrective Work immediately.

15.4.1

If Contractor fails to respond to or correct defective Work within the time required, the City may, after written notice, perform or cause the corrective Work to be performed. Contractor shall reimburse the City for all reasonable costs incurred, including labor, materials, and administrative costs. The City may deduct such costs from retainage, from amounts otherwise due Contractor, or recover such costs through the performance bond.

15.5 Manufacturer's Warranties

Contractor shall obtain and deliver to the City all manufacturer warranties covering equipment, materials, and systems. Manufacturer warranties shall be issued in the City’s name and shall commence on the later of Substantial Completion, start up, or acceptance of the applicable system or equipment, unless the Contract Documents require a different commencement date.

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15.6 Warranty Extension

If work is corrected during the warranty period, the warranty for that portion of work shall be extended for one (1) year from the date of correction.

15.7 Warranty Bond (If Required)

If specified, Contractor shall provide a warranty bond guaranteeing obligations under the warranty provisions.

15.8 Warranty documentation

Within fourteen (14) days of Substantial Completion, Contractor shall provide a warranty matrix identifying each warranted item, warranty duration, start date, manufacturer, installer, point of contact, and any required maintenance actions. Contractor shall designate a single warranty point of contact responsible for coordinating warranty requests.

ARTICLE 16: PROJECT CLOSEOUT

16.1 Substantial Completion Procedures

16.1.1 Request for Substantial Completion

When Contractor considers the work substantially complete, Contractor shall submit written request for substantial completion inspection including:

(a) Statement that work is substantially complete;

(b) List of minor items remaining to be completed (preliminary punch list);

(c) Expected completion dates for punch list items;

(d) Copies of required certifications and approvals.

16.1.2 Substantial Completion Inspection

Within ten (10) days of request, the City shall conduct inspection to determine if work is substantially complete. The City shall prepare a punch list of items requiring completion or correction.

16.1.3 Certificate of Substantial Completion

The Certificate of Substantial Completion shall establish the date governing commencement of warranty periods under Article 15, except for Work completed after Substantial Completion as described therein.

(a) Date of Substantial Completion;

(b) Responsibilities of City and Contractor for security, maintenance, utilities;

(c) Time for completing punch list items;

(d) Commencement of warranty period.

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16.2 Punch List Completion

Contractor shall complete all punch list items within thirty (30) days of Substantial Completion or within time specified in Certificate of Substantial Completion. The City may withhold final payment until all punch list items are completed.

16.3 Final Completion Requirements

Before final payment, Contractor shall submit:

16.3.1 As-Built Drawings

(a) Complete set of as-built (record) drawings showing:

- All changes made during construction;

- Exact locations of underground utilities and piping;

- Actual dimensions and elevations;

- Equipment locations and model numbers;

(b) Drawings shall be in both hard copy and electronic formats (CAD and PDF);

(c) Drawings shall be clearly marked "AS-BUILT" or "RECORD DRAWINGS."

16.3.2 Operations and Maintenance Manuals

Complete O&M manuals including:

(a) Table of contents organized by specification section;

(b) Operating instructions for all equipment and systems;

(c) Maintenance procedures and schedules;

(d) Parts lists and supplier contact information;

(e) A detailed listing of all subcontractors retained under each specification section, including their respective contact information and the length of warranty coverage for work performed, with warranty periods beginning as provided in Article 15;

(f) Warranty information;

(g) Emergency procedures;

(h) Shop drawings and product data;

(i) Test reports and certifications.

Manuals shall be:

(a) Organized in three-ring binders with tabs;

(b) Submitted in both hard copy (3 sets) and electronic formats;

(c) Written in clear, concise language.

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16.3.3 Training

Contractor shall provide training for City personnel on operation and maintenance of all systems and equipment. Training shall include:

(a) Minimum four (4) hours of hands-on training. Depending on the facility type, additional training may be required;

(b) Training during normal business hours;

(c) Training for designated City personnel;

(d) Documentation of training provided.

16.4 Keys and Access Devices

Contractor shall deliver to the City:

(a) All keys for locks, including master keys;

(b) Access cards, fobs, and codes;

(c) Key schedule showing door numbers and key types;

(d) Spare keys as specified.

16.5 Spare Parts and Materials

Contractor shall deliver spare parts, maintenance materials, and extra stock as specified, including:

(a) Attic stock for ceiling tiles, flooring, etc.;

(b) Spare filters for mechanical systems;

(c) Spare lamps and ballasts;

(d) Touch-up paint;

(e) Other items as specified.

16.6 Cleanup and Removal

Before final inspection, Contractor shall:

(a) Remove all equipment, tools, and surplus materials;

(b) Remove temporary facilities and utilities;

(c) Repair damage caused by removal operations;

(d) Perform final cleaning per Section 13.5.2;

(e) Remove all construction signage.

16.7 Final Inspection and Acceptance

16.7.1 Request for Final Inspection

After completing all punch list items and submitting closeout documentation, Contractor shall request final inspection in writing.

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16.7.2 Final Inspection

The City shall conduct final inspection within ten (10) days of request. If work is acceptable, the City shall issue notice of Final Completion.

16.7.3 Acceptance of Work

The City's acceptance of final payment application and payment of final payment amount shall constitute acceptance of the work, subject to warranty obligations.

ARTICLE 17: RESERVED

ARTICLE 18: ENVIRONMENTAL COMPLIANCE AND EROSION CONTROL

18.1 Environmental Protection

Contractor shall conduct operations in manner that minimizes environmental impacts and complies with all environmental laws and regulations, including:

(a) Clean Water Act;

(b) Clean Air Act;

(c) Resource Conservation and Recovery Act;

(d) North Carolina environmental regulations;

(e) Local environmental ordinances.

18.2 Erosion and Sediment Control

18.2.1 Erosion Control Plan

If project disturbs one acre or more, Contractor shall:

(a) Obtain coverage under North Carolina's NPDES General Permit (NCG01) for stormwater discharges;

(b) Prepare and implement an Erosion and Sediment Control Plan in accordance with NC Sedimentation Pollution Control Act (N.C. Gen. Stat. § 113A-50 et seq.);

(c) Install and maintain erosion control measures including silt fencing, sediment basins, inlet protection, and temporary stabilization;

(d) Conduct inspections at least every seven (7) days and within 24 hours of storm events;

(e) Maintain records and make available for inspection.

18.2.2 Stormwater Pollution Prevention

Contractor shall implement best management practices to prevent pollution of stormwater, including:

(a) Proper storage and handling of materials;

(b) Containment of concrete washout;

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(c) Control of dust and airborne particulates;

(d) Prevention of tracking sediment onto public streets;

(e) Protection of storm drain inlets.

18.3 Hazardous Materials Management

18.3.1 Hazardous Materials Handling

Contractor shall:

(a) Store all hazardous materials in approved containers;

(b) Maintain Safety Data Sheets (SDS) on site;

(c) Implement spill prevention measures;

(d) Have spill response equipment readily available;

(e) Immediately report spills to City and appropriate agencies.

18.3.2 Waste Disposal

All waste materials shall be disposed of properly:

(a) Solid waste to licensed landfills;

(b) Hazardous waste through licensed hazardous waste haulers;

(c) Recyclable materials to recycling facilities where feasible;

(d) No burning of waste materials on site unless specifically approved.

18.3.3 Asbestos and Lead Paint

If work involves structures built before 1978 or that may contain asbestos:

(a) Contractor shall comply with OSHA asbestos standards (29 C.F.R. § 1926.1101);

(b) Contractor shall comply with EPA Lead Renovation, Repair and Painting Rule (40 C.F.R. Part 745);

(c) Contractor shall employ certified lead and asbestos professionals as required;

(d) Contractor shall implement appropriate containment and disposal procedures.

18.4 Wetlands and Protected Areas

Contractor shall not disturb wetlands, streams, or other protected environmental areas without proper permits from U.S. Army Corps of Engineers, NC Department of Environmental Quality, and other agencies having jurisdiction.

18.5 Tree Protection

Contractor shall protect trees designated for preservation:

(a) Install tree protection fencing at drip line;

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(b) Prohibit storage, traffic, or construction activities within protected areas;

(c) Contractor shall be liable for damage to protected trees at rate specified in Contract Documents or $1,000 per caliper inch, whichever is greater.

ARTICLE 19: SAFETY REQUIREMENTS

19.1 Safety Program

Contractor shall establish and maintain a comprehensive safety program complying with:

(a) Occupational Safety and Health Act (OSHA) regulations (29 C.F.R. Part 1926);

(b) North Carolina Department of Labor safety requirements;

(c) Industry safety standards;

(d) Contract-specific safety requirements.

19.2 Site Safety Plan

Within ten (10) days of Notice to Proceed, Contractor shall submit a Site Safety Plan including:

(a) Identification of site-specific hazards;

(b) Safety procedures and protocols;

(c) Emergency response procedures;

(d) Competent person designations;

(e) Training requirements;

(f) Personal protective equipment (PPE) requirements.

19.3 Safety Meetings and Training

Contractor shall:

(a) Conduct daily toolbox safety talks; (b) Hold weekly safety meetings; (c) Provide OSHA 10- hour or 30-hour training for workers as appropriate; (d) Train workers on hazard communication (HazCom); (e) Maintain training records.

19.4 Accident Reporting

Contractor shall immediately report to the City:

(a) All fatalities and serious injuries;

(b) Incidents requiring medical treatment beyond first aid;

(c) Near-miss incidents;

(d) Property damage incidents exceeding $1,000;

(e) Spills or environmental releases.

Contractor shall submit written accident reports within 24 hours using forms provided by the City.

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19.5 OSHA Compliance

19.5.1 General Requirements

Contractor shall comply with all applicable OSHA standards, including but not limited to:

(a) Fall protection (29 C.F.R. § 1926.501);

(b) Scaffolding (29 C.F.R. § 1926.451);

(c) Excavation and trenching (29 C.F.R. § 1926.651);

(d) Electrical safety (29 C.F.R. § 1926.400);

(e) Personal protective equipment (29 C.F.R. § 1926.95);

(f) Hazard communication (29 C.F.R. § 1926.59).

19.5.2 Competent Persons

Contractor shall designate competent persons as required by OSHA for:

(a) Excavation and trenching operations; (b) Scaffolding erection and inspection; (c) Fall protection systems; (d) Other operations requiring competent person oversight.

19.6 Right to Stop Work

The City reserves the right to stop work if Contractor's operations create imminent danger or serious safety violations. Contractor shall bear all costs associated with work stoppage due to safety violations.

ARTICLE 20: DISPUTES, CLAIMS, AND REMEDIES

20.1 Claims Procedure

20.1.1 Notice of Claim

Any claim by Contractor for adjustment of Contract Sum or Contract Time must be submitted in writing to the City within ten (10) calendar days after occurrence of the event giving rise to the claim or within ten (10) days after Contractor knew or should have known of the facts giving rise to the claim.

20.1.2 Claim Documentation

Each claim shall include:

(a) Detailed factual statement of claim; (b) Specific Contract provisions supporting claim; (c) Supporting documentation including schedules, cost records, correspondence; (d) Amount claimed (if monetary); (e) Time extension requested (if applicable); (f) Relief requested.

20.1.3 City Review

The City shall review claims and respond in writing within thirty (30) days. The City's decision shall be final and binding unless Contractor pursues further remedies as provided herein.

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20.2 Continuing Performance During Disputes

Contractor shall continue to perform work diligently during pendency of any dispute or claim. Failure to continue performance may constitute material breach and grounds for termination.

20.3 Mediation

If the parties cannot resolve a dispute through negotiation, either party may request non-binding mediation. The parties shall share mediation costs equally. Mediation shall be conducted in Cumberland County, North Carolina.

20.4 Litigation

If mediation is unsuccessful or either party declines mediation, disputes may be resolved through litigation in accordance with Article 25 (Governing Law and Venue).

20.5 No Waiver of Sovereign Immunity

Nothing in this Contract shall be construed as a waiver of the City's governmental immunity under North Carolina law.

20.6 Attorney's Fees

Each party shall bear its own attorneys' fees and costs in any legal action between the Parties to enforce this Contract. This Section does not waive, limit, or otherwise affect the City's right to recover attorneys' fees, litigation and arbitration expenses, and court costs where recovery is authorized by statute, including N.C. Gen. Stat. § 44A-35 in any suit brought or defended under Article 2 or Article 3 of Chapter 44A of the General Statutes, or the City's right to recover such fees, expenses, and costs as part of Contractor's indemnification obligation under Section 2.3 and N.C. Gen. Stat. § 22B-1(d).

ARTICLE 21: SUSPENSION OF WORK

21.1 City's Right to Suspend

The City may, at any time and for any reason, suspend all or any portion of the work by giving written notice to Contractor. Upon receipt of notice, Contractor shall:

(a) Immediately suspend work as directed;

(b) Protect and secure work in place;

(c) Provide security as necessary;

(d) Take reasonable measures to minimize costs.

21.2 Compensation for Suspension

If suspension exceeds thirty (30) consecutive days and is not due to Contractor's fault, Contractor may be entitled to adjustment for:

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(a) Actual costs of demobilization and remobilization; (b) Actual costs of protecting and securing work; (c) Actual extended general conditions costs; (d) Extension of Contract Time.

Contractor shall not be entitled to anticipated profit on work not performed during suspension.

21.3 Resumption of Work

The City shall provide written notice to resume work. Contractor shall resume work within seven (7) days of notice unless a different time is specified.

21.4 Contractor's Right to Suspend or Terminate

If the Work is stopped by order of a court having jurisdiction, or by order of any other public authority, for a period of three (3) consecutive months through no fault of and for causes beyond the control of Contractor, or if the City fails to pay an undisputed amount properly due Contractor within sixty (60) days after the date payment is due under Article 10, then Contractor may, after fifteen (15) days' written notice to the City sent by certified mail, return receipt requested, suspend operations on the Work or terminate this Contract.

Upon termination by Contractor under this Section, Contractor's sole remedy shall be payment determined in accordance with Section 23.1 (Termination for Convenience of the City), and Contractor shall not be entitled to anticipated profit on unperformed work or to consequential damages. This Section does not apply to a suspension directed by the City under Section 21.1, and does not relieve Contractor of any obligation that survives termination.

ARTICLE 22: CITY PAYMENT OBLIGATIONS

City does hereby covenant and agree with Contractor that it will pay to Contractor, when due payable under the terms of said Specifications and said Award, the above-mentioned sum, and that it will faithfully comply with and perform each and every obligation imposed upon it by said Specifications and the terms of said Award.

ARTICLE 23: TERMINATION PROVISIONS

23.1 Termination For Convenience Of The City

23.1.1 City's Right to Terminate

The City may terminate this Contract, in whole or in part, for its convenience whenever the City determines that such termination is in the City's best interest. The City shall provide written notice of termination to Contractor specifying the extent of termination and the effective date, which shall be not less than ten (10) calendar days from the date of the notice.

23.1.2 Contractor's Obligations Upon Notice

Upon receipt of a notice of termination, and except as otherwise directed by the City, Contractor shall immediately proceed with the following obligations:

(a) Stop Work. Stop work as specified in the notice on the date and to the extent specified;

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(b) Terminate Orders. Terminate all subcontracts and orders to the extent they relate to the terminated work;

(c) Protect Property. Take all necessary or directed action to protect and preserve property in Contractor's possession in which the City has or may acquire an interest;

(d) Transfer Title. Transfer title and deliver to the City, in the manner and to the extent directed:

- Completed supplies and work in process;
- Parts, materials, tools, dies, jigs, fixtures, plans, drawings, information, and contract rights (collectively "Materials") acquired or produced for the terminated work, whether completed or in process;

(e) Settlement of Obligations. Use best efforts to sell, as directed or authorized by the City, any property of the types referred to in subsection (d) above. However, Contractor:

- Shall not be required to extend credit to any purchaser; and
- May acquire the property under the conditions prescribed by and at prices approved by the City;

(f) Complete Performance. Complete performance of work not terminated;

(g) Take Protective Action. Take any action that may be necessary, or that the City may direct, for the protection and preservation of property related to this Contract that is in Contractor's possession and in which the City has or may acquire an interest;

(h) Promptly Submit Claims. Submit to the City, within sixty (60) calendar days from the effective date of termination, or such longer period as approved by the City, a properly supported termination settlement proposal.

23.1.3 Basis for Settlement

After receipt of a notice of termination, Contractor shall submit to the City its termination claim, in the form and with the certification prescribed by the City. Such claim shall be submitted promptly but in no event later than sixty (60) calendar days from the effective date of termination, unless one or more extensions in writing are granted by the City upon written request of Contractor made within such sixty (60) day period or authorized extension thereof.

Upon termination for convenience, Contractor shall be entitled to receive payment for:

(a) Completed Work. All work executed in accordance with the Contract Documents and accepted by the City prior to the effective date of termination;

(b) Work in Progress. Work in progress to the extent it represents a portion of the Contract Sum that has value to the City, subject to the City's verification and acceptance;

(c) Materials and Equipment. Materials, equipment, and supplies purchased or irrevocably committed for purchase by Contractor for use in the work, provided that:

- Such materials conform to Contract requirements;
- Title to materials shall pass to the City upon payment;
- Materials shall be delivered to the City or stored and protected as directed;

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• Contractor provides satisfactory evidence of purchase commitments;

(d) Settlement Costs. Actual, reasonable costs necessarily incurred by Contractor in preparing to perform and in performing the terminated work, including:

• Costs of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the Contract (excluding the amounts of such settlements);

• Reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data;

• Demobilization costs actually incurred;

• Costs of breaking down and removing temporary facilities and returning the site to the condition required by the Contract Documents;

• Costs of storing and protecting materials, equipment, and property in Contractor's possession;

(e) Reasonable Profit. A reasonable profit on the cost of work performed, but excluding:

• Profit on settlement expenses under subsection (d);

• Profit on materials and equipment that were not incorporated into the work and that are returned to suppliers under arrangements satisfactory to the City;

23.1.4 Excluded Costs

The following costs shall NOT be allowable in the termination settlement:

(a) Anticipated profit on unperformed work;

(b) Costs that would have been incurred regardless of termination (e.g., general overhead not specifically allocable to this Contract);

(c) Claims for damages, including loss of anticipated profits or revenue on work not performed;

(d) Costs not properly allocable to the terminated work;

(e) Costs for which Contractor has been or will be reimbursed under any other Contract or agreement;

(f) Excessive or unreasonable costs as determined by the City.

23.1.5 Total Amount Limitation

In no event shall the total amount paid to Contractor under a termination for convenience exceed the Contract Sum, less payments otherwise made or to be made, and less the contract price of work not terminated.

23.1.6 Termination Settlement Proposal

Contractor's termination settlement proposal shall include:

(a) A detailed itemization of all claims under Section 23.1.3;

(b) Complete supporting documentation, including:

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- Copies of paid invoices;
- Certified payroll records;
- Subcontractor termination settlement agreements;
- Equipment rental records;
- General ledger entries;
- Cost allocation methodologies;

(c) A schedule of values showing percentage of completion for each line item at time of termination;

(d) An inventory of materials and equipment purchased for the work;

(e) A list of all outstanding subcontracts and purchase orders, with termination proposals from each;

(f) Certification by Contractor's authorized representative that:

- The claim is made in good faith;
- Supporting data is accurate and complete;
- The amount claimed is just and proper;
- Contractor is entitled to payment under the terms of the Contract.

23.1.7 City's Right to Audit

The City shall have the right to audit and examine all books, records, and other evidence and supporting documents of Contractor relevant to the termination settlement proposal. Contractor shall preserve all such records for three (3) years after final settlement.

23.1.8 Assignment of Subcontracts

The City may require Contractor to assign to the City all or any part of Contractor's right, title, and interest under any or all subcontracts and purchase orders terminated as a result of the termination of this Contract. Upon such assignment, the City shall have the right, in its discretion, to settle or pay any or all claims arising out of termination of such subcontracts and orders.

23.1.9 Continuing Obligations

Termination of this Contract, either in whole or in part, shall not relieve Contractor of obligations under the Contract for work not terminated, including but not limited to:

(a) Warranty obligations for completed work under Article 15; (b) Indemnification obligations under Article 2.3; (c) Insurance obligations under Article 4 for work performed; (d) Confidentiality obligations, if any; (e) Compliance with federal and state nondiscrimination requirements.

23.1.10 Subcontractor Claims

Before submitting a termination settlement proposal, Contractor shall obtain settlement proposals from all terminated subcontractors. Contractor may include in its own proposal only costs and

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profits applicable to work performed by Contractor's own forces, plus settlement costs of subcontracts properly chargeable to the terminated work.

23.1.11 Disputes

If Contractor and the City fail to agree upon the amount to be paid as a result of termination for convenience, the City shall pay Contractor the amount determined by the City. Any dispute concerning questions of fact arising under this termination clause shall be resolved in accordance with Article 20 (Disputes, Claims, and Remedies).

23.1.12 Notice to Sureties

The City shall provide notice of termination to any sureties providing payment and performance bonds for the Contract.

23.1.13 Partial Termination

If only part of the work is terminated, Contractor shall file a proposal for an equitable adjustment of the price for the continued portion of the Contract. The City shall make an equitable adjustment for any increase or decrease in the cost of, or time required for, performance of the remainder of the Contract resulting from the partial termination.

23.1.14 Effect on Other Remedies

The rights and remedies of the City provided in this Article 23.1 are in addition to any other rights and remedies provided by law or under this Contract.

23.2 Termination For Cause (Default).

23.2.1 GROUNDS FOR TERMINATION. The CITY may, subject to the provisions of Section 23.2.2, terminate this Contract in whole or in part if Contractor:

(a) Fails to perform the work within the time specified in this Agreement or any written authorization or extension granted by the CITY;

(b) Fails to make progress in the performance of the work so as to endanger performance of this Agreement in accordance with its terms;

(c) Fails to comply with any material term or condition of this Agreement, including but not limited to obligations regarding insurance, indemnification, payment and performance bonds, compliance with laws, or quality of workmanship; or

(d) Anticipatorily repudiates its obligations under this Agreement.

23.2.2 NOTICE AND OPPORTUNITY TO CURE. Before terminating this Agreement for

cause, the CITY shall provide written notice to CONTRACTOR specifying:

(a) The nature and details of the default or failure to perform;

(b) The corrective action required; and

(c) The time period within which CONTRACTOR must cure the default.

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CONTRACTOR shall have ten (10) calendar days from receipt of such notice to cure the default or, if the default cannot reasonably be cured within ten (10) days, to commence cure and submit a written cure plan acceptable to the CITY demonstrating how CONTRACTOR will diligently pursue cure to completion within a reasonable time period. The CITY, in its sole discretion, may approve an extended cure period not to exceed thirty (30) additional days.

23.2.3 TERMINATION AFTER FAILURE TO CURE. If CONTRACTOR fails to cure the default within the specified time period or fails to diligently pursue an approved cure plan, the CITY may terminate this Agreement, in whole or in part, by providing written notice of termination to CONTRACTOR. The termination shall be effective as specified in the notice, but no earlier than ten (10) calendar days after CONTRACTOR's receipt of the notice of termination.

23.2.4 CONTRACTOR'S OBLIGATIONS UPON TERMINATION FOR CAUSE. Upon receipt of a notice of termination for cause, and except as otherwise directed by the CITY, CONTRACTOR shall:

(a) Immediately stop work under this Agreement on the date and to the extent specified in the notice of termination;

(b) Place no further orders or subcontracts for materials, equipment, supplies, or services related to the terminated work, except as necessary to complete any portion of the work not terminated;

(c) Terminate all orders and subcontracts to the extent they relate to the terminated work;

(d) Transfer title and deliver to the CITY, in the manner and to the extent directed by the CITY: (1) All fabricated or unfabricated parts, work in process, completed work, supplies, equipment, and other materials acquired or produced for the terminated portion of this Agreement; (2) All construction documents, shop drawings, submittals, as-built drawings, operation and maintenance manuals, warranties, and other project documentation; (3) All tools, construction equipment, scaffolding, and temporary structures located at the project site;

(e) Use its best efforts to sell, as directed or authorized by the CITY, any property transferred to the CITY under subsection (d) above; provided, however, that CONTRACTOR shall be liable to the CITY for any costs or losses incurred as a result of CONTRACTOR's failure to protect or maintain such property;

(f) Complete performance of any work not terminated;

(g) Secure the construction site and protect and preserve all CITY property and work in place;

(h) Provide the CITY and any replacement contractor(s) with reasonable cooperation, information, and assistance necessary to complete the construction work or transition the project, including but not limited to providing access to the site, information about subcontractors and suppliers, and details regarding construction methods and materials used;

(i) Remove from the project site all of CONTRACTOR's tools, construction equipment, machinery, and surplus materials as directed by the CITY;

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(j) Take any other action that may be necessary, or that the CITY may direct, for the protection and preservation of CITY property and the construction project.

23.2.5 CITY'S RIGHTS TO COMPLETE THE WORK. After termination for cause, the CITY may:

(a) Take over the construction work and prosecute the same to completion by contract or otherwise;

(b) Complete the terminated portion of the work by whatever method the CITY deems expedient, including entering into agreements with other contractors;

(c) Withhold any payments to CONTRACTOR for the purpose of set-off or partial payment of amounts owed to the CITY;

(d) Take possession of and utilize, in completing the work, any materials, equipment, tools, supplies, construction equipment, and facilities belonging to CONTRACTOR that are on the project site and necessary for completion of the work.

23.2.6 EXCESS REPROCUREMENT COSTS AND LIABILITY. If the CITY terminates this Agreement for cause, CONTRACTOR shall be liable to the CITY for excess costs incurred by the CITY in completing the construction work. Excess costs shall include, but are not limited to:

(a) The costs to the CITY of completing the construction work under this Agreement, whether by hiring replacement contractor(s), performing the work with CITY forces, or any combination thereof;

(b) The difference between the total amount which would have been payable to CONTRACTOR under this Agreement and the total amount actually paid by the CITY to complete the work, including payments to replacement contractor(s);

(c) Additional administrative costs and expenses incurred by the CITY as a direct result of the default and termination, including but not limited to costs of procurement, construction management, inspection services, and project administration;

(d) Costs associated with project delays, including extended general conditions, additional design fees, and escalation costs;

(e) Costs to correct defective or non-conforming work performed by CONTRACTOR;

(f) Attorneys' fees, litigation and arbitration expenses, and court costs actually incurred by the City, including without limitation: (i) fees, expenses, and costs incurred by the City in defending against third-party claims arising out of or relating to the Work, which Contractor shall pay as part of its indemnification obligation under Section 2.3 and as permitted by N.C. Gen. Stat. § 22B-1(d), where the fault of Contractor or its derivative parties is a proximate cause of those fees, expenses, or costs; (ii) fees and expenses allowed to the City as the prevailing party under N.C. Gen. Stat. § 44A-35 in any suit brought or defended under Article 2 or Article 3 of Chapter 44A of the General Statutes, including any action on the payment bond or performance bond furnished under Article 5 of this Contract; and (iii) fees, expenses, and costs otherwise recoverable by the City under any applicable statute; and

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(g) Any other actual damages sustained by the CITY as a direct and proximate result of CONTRACTOR's default.

23.2.7 PAYMENT AFTER TERMINATION FOR CAUSE. After termination for cause and upon written demand, CONTRACTOR shall pay to the CITY the amount of excess costs as determined under Section 23.2.6. However, if the amount owed by CONTRACTOR exceeds the unpaid balance of the Agreement price, CONTRACTOR shall pay the excess to the CITY. Conversely, if the CITY's cost to complete the work is less than the unpaid balance of the Agreement price, the CITY shall pay the difference to CONTRACTOR, subject to any offsets for damages or other amounts owed to the CITY.

Subject to the excess cost provisions above, the CITY shall pay CONTRACTOR for:

(a) Completed work that has been accepted by the CITY prior to the effective date of termination, at the rate or price specified in this Agreement; and

(b) Reasonable costs incurred by CONTRACTOR in mobilization, procurement of materials, and performing the terminated work, to the extent such costs are properly allocable to the terminated portion of the Agreement, adequately documented, and approved by the CITY.

CONTRACTOR shall not be paid for:

- Work not accepted by the CITY;
- Defective or non-conforming work;
- Costs incurred due to CONTRACTOR's fault or negligence;
- Anticipated profit on unperformed work; or
- Consequential damages.

23.2.8 NO PAYMENT DURING DISPUTE. Notwithstanding any other provision of this Agreement, the CITY may withhold from amounts otherwise due to CONTRACTOR such sums as the CITY determines to be necessary to protect the CITY against loss due to outstanding liens or claims, defective work, failure to pay subcontractors or suppliers, or to reimburse the CITY for excess costs as provided in Section 23.2.6.

23.2.9 CONTRACTOR'S RIGHT TO DISPUTE TERMINATION. If CONTRACTOR disputes the termination for cause, CONTRACTOR must, within thirty (30) calendar days of receiving the notice of termination, provide written notice to the CITY of such dispute, specifying in detail the basis for the dispute. Failure to timely dispute the termination shall constitute CONTRACTOR's acceptance of the termination for cause and waiver of any right to contest it.

If CONTRACTOR timely disputes the termination, the matter shall be resolved in accordance with Article 25.1 (Governing Law) and Article 25.2 (Venue and Forum) of this Agreement.

23.2.10 CONVERSION TO TERMINATION FOR CONVENIENCE. If, after termination for cause under this Article 23.2, it is determined through agreement of the parties or by final judgment of a court of competent jurisdiction that:

(a) CONTRACTOR was not in default;

(b) The default was excusable; or

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(c) The CITY wrongfully terminated the Agreement;

then the termination shall be deemed to have been a termination for convenience under Article 23.1 from the effective date of termination. In such case:

- The rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the CITY under Article 23.1;
- CONTRACTOR's sole remedy shall be payment in accordance with Article 23.1 (Termination for Convenience);
- CONTRACTOR shall not be entitled to recover anticipated profit on unperformed work, consequential damages, or any damages beyond those provided in Article 23.1; and
- The CITY shall not be liable for any excess costs of reprocurement.

23.2.11 CUMULATIVE REMEDIES. The rights and remedies of the CITY provided in this Article 23.2 are not exclusive and are in addition to any other rights and remedies provided by law, equity, or under this Agreement. Termination for cause shall not relieve CONTRACTOR from liability for any breach of this Agreement or from any indemnification obligations under Article 5.

23.2.12 NO LIABILITY FOR CONSEQUENTIAL DAMAGES. Except as expressly provided in Section 23.2.6 regarding excess reprocurement costs, neither party shall be liable to the other for consequential, incidental, indirect, or special damages arising out of or related to termination for cause, including but not limited to lost profits, lost business opportunities, or damage to reputation

ARTICLE 24: ASSIGNMENT

It is the intent of this Agreement to secure the personal services of Contractor and failure of Contractor for any reason to make the personal services available to the City of Fayetteville for the purposes described in this Agreement shall be cause for termination of this Agreement. Contractor shall not assign this Agreement without prior written consent of the City of Fayetteville.

ARTICLE 25: GOVERNING LAW AND VENUE

25.1 Governing Law

The validity, interpretation, and execution of this Agreement and the performance of and rights accruing under this Agreement are all to be governed by the laws of North Carolina.

25.2 Venue and Forum Selection

The Parties expressly agree that if litigation is brought in connection with this Agreement and (1) the litigation proceeds in the Courts of the State of North Carolina, the Parties agree that the appropriate venue shall be in Cumberland County (Fourteenth Judicial District of North Carolina); or (2) the litigation proceeds in a federal court, the Parties agree that the appropriate venue shall be the United States District Court for the Eastern District of North Carolina.

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ARTICLE 26: COMPLIANCE WITH LAWS

Contractor agrees to comply with all applicable statutes, ordinances, and regulations of the United States, the State of North Carolina, the City and units of local government.

ARTICLE 27: REGULATORY CERTIFICATIONS

27.1 E-Verify

Contractor hereby acknowledges that "E-Verify" is the federal E-Verify program operated by the US Department of Homeland Security and other federal agencies which is used to verify the work authorization of newly hired employees pursuant to federal law and in accordance with Article 2, Chapter 64 of the North Carolina General Statutes. Contractor further acknowledges that all employers, as defined by Article 2, Chapter 64 of the North Carolina General Statutes, must use E-Verify and after hiring an employee to work in the United States, shall verify the work authorization of the employee through E-Verify in accordance with NCGS §64-26(a). Contractor hereby pledges, attests and warrants through execution of this Agreement that Contractor complies with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes and further pledges, attests and warrants that any subcontractors currently employed by or subsequently hired by Contractor shall comply with any and all E-Verify requirements. Failure to comply with the above requirements shall be considered a breach of this Contract. This provision is included as required by N.C. Gen. Stat. § 143-133.3.

27.2 Divestment of Companies Boycotting Israel or Investing in Iran Certification

Contractor certifies that: (i) it is not identified on the Final Divestment List or any other list of prohibited investments created by the NC State Treasurer pursuant to N.C.G.S. 147-86.58; (ii) it has not been designated by the NC State Treasurer pursuant to N.C.G.S. 147-86.81 as a company engaged in the boycott of Israel ((i) and (ii) to be collectively referred to as "FD Lists"); and (iii) it will not take any action causing it to appear on the Treasurer's FD Lists created by the NC State Treasurer during the term of this Agreement. By signing this Agreement, Contractor further agrees, as an independent obligation, separate and apart from this Agreement, to reimburse the City for any and all damages, costs and attorneys' fees incurred by the City in connection with any claim that this Agreement or any part thereof is void due to Contractor appearing on the Treasurer's FD Lists at any time before or during the term of this Agreement.

ARTICLE 28: CITY OF FAYETTEVILLE GENERAL PROVISIONS

28.1 Severability

The Parties agree that if any provision of this Agreement shall be held invalid for any reason, the remaining provisions shall not be affected if they may continue to conform with the purposes of this Agreement and the requirements of applicable law.

28.2 Force Majeure

Neither Party shall be deemed to be in default of its obligations hereunder if and so long as it is prevented from performing such obligations by an act of war, hostile foreign actions, adverse

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governmental actions, nuclear explosion, earthquake, hurricane, tornado, or other catastrophic natural event or act of God.

28.3 Morality Clause

If, in the sole opinion of the City, at any time Contractor any of its owner(s) or employee(s) or agent(s) (collectively referenced as an "Actor") engages in any one or more of the actions below, the City may immediately upon written notice to Contractor, terminate this Agreement, in addition to any other rights and remedies that the City may have hereunder or at law or in equity:

- bring disrepute, contempt, scandal, or public ridicule to the Actor;
- subject the Actor to prosecution;
- offend the community or public morals/decency;
- denigrate individuals or groups in the community served by the City;
- is scandalous or inconsistent with community standards or good citizenship;
- adversely affect the City's finances, public standing, image, or reputation;
- is embarrassing or offensive to the City or may reflect unfavorably on the City; and,
- is derogatory or offensive to one or more employee(s) or customer(s) of the City.

28.4 Non-Appropriation

Notwithstanding any other provisions of this Agreement, the Parties agree that payments due hereunder from the City are from appropriations and monies from the City Council and any other governmental entities. In the event sufficient appropriations or monies are not made available to the City to pay the terms of this Agreement for any fiscal year, this Agreement shall terminate immediately without further obligation of City.

28.5 Independent Contractor

Contractor is an Independent Contractor and shall undertake performance of the services pursuant to the terms of this Agreement as an Independent Contractor. Contractor shall be wholly responsible for the methods, means and techniques of performance. City shall have no right to supervise methods and techniques of performance employed by Contractor but City shall have the right to observe such performance.

28.6 Amendment

The City and Contractor may, from time to time, request changes in services to be performed by Contractor. Any such changes that are mutually agreed upon by the City and Contractor shall be incorporated herein by written amendment to this Agreement. It is mutually agreed and understood that no alteration or validation of the terms of this Agreement shall be valid unless made in writing and signed by the Parties hereto, and that any oral understanding or agreements not incorporated herein, unless made in writing and signed by the Parties hereto, shall not be binding.

28.7 Entire Agreement

This Agreement constitutes the entire agreement between the Parties. Any proposed change to this Agreement shall be submitted to the City for its prior approval. No modification, addition, deletion,

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etc., to this Agreement shall be effective unless and until such changes are reduced to writing and executed by the authorized officers of each Party.

28.8 City's Terms Supersede

The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In the event of a conflict, inconsistency, or ambiguity among the Contract Documents, precedence shall be given in the following order: (1) this Contract, including any fully executed written amendment or Change Order, the most recent controlling over the earlier; (2) the Special Provisions; (3) the Standard Specifications; (4) the addenda, the later controlling over the earlier; (5) the Invitation for Bids and any instructions to bidders; (6) the drawings; and (7) the Proposal/Bid. Any general conditions or administrative provisions contained in the solicitation documents are superseded by this Contract to the extent of any conflict.

28.9 Survival of Terms

All warranties, covenants, and representations contained within this Contract and all applicable work authorizations, if any, shall survive the termination or expiration of this Contract. This Section does not extend, shorten, or otherwise modify the warranty periods specified in Article 15, any applicable manufacturer warranties, or any period of limitation or repose applicable to a claim by either party, including N.C. Gen. Stat. § 1-50(a)(5).

28.10 Singular/Plural

Whenever used herein, the singular shall include the plural, the plural the singular and the use of any gender shall be applicable to all genders as the context may require.

28.11 Conflict of Interest

Contractor represents and warrants that no officer, employee, or agent of the City who exercises or has exercised any function or responsibility with respect to the work under this Contract, or who is in a position to participate in a decision-making process or to gain inside information with regard to such work, has or shall have any direct or indirect personal or financial interest in this Contract or in the proceeds hereof. Contractor further represents that it has not violated N.C. Gen. Stat. § 14-234 or § 133-32 in connection with the award of this Contract.

28.12 Records Retention and Right to Audit

Contractor shall maintain all books, records, documents, and other evidence pertaining to the costs and expenses of this Contract, and to the work performed, in accordance with generally accepted accounting principles. Contractor shall retain such records for a period of not less than five (5) years following Final Completion, or until the resolution of any audit finding, claim, or litigation relating to this Contract, whichever is later. The City, the State Auditor, and their authorized representatives shall have access to such records at reasonable times for the purpose of examination and audit. Contractor shall include this requirement in every subcontract.

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IN WITNESS WHEREOF, the parties have executed this Agreement by their duly authorized representatives effective the day and year first above written.

ATTEST:

_____

JENNIFER L. AYRE

City Clerk

CITY OF FAYETTEVILLE:

_____

Dr. Douglas J. Hewett, ICMA-CM

City Manager

DATE: _____

CONTRACTOR NAME

BY:_____

PRINT:_____

TITLE: _____

DATE: _____

This instrument has been pre-audited in the Manner required by the Local Government Budget and Fiscal Control Act.

_____

Chief Financial Officer

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Exhibits List

1. Proposal/Bid
2. Addendum Acknowledgment
3. Bond Forms
4. Licenses/Certifications
5. Lien Waiver Forms
6. Certificate of Insurance
7. Pay Application Form Example
8. Change Order Request Form Example
9. Special Provisions, Specifications and Drawings

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Exhibit 1

Proposal/Bid

Exhibit 2

Addendum Acknowledgment

Exhibit 3

Bond Forms

Exhibit 4

Licenses/Certifications

Exhibit 5

Lien Waiver Forms

Exhibit 6

Certifications of Insurance

Exhibit 7

Pay Application Form Example

Exhibit 8

Change Order Form Example

Exhibit 9

Special Provisions, Specifications and Drawings

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PERFORMANCE BOND

Date of Contract:_____

Date of Execution:_____

Name/Address of Principal:_____

_____

Name/Address of Surety:_____

_____

Name/Address of Contracting Body:_____

_____

Amount of Bond (Printed):_____

Project: **NC VETERANS PARK PHASE II**

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, identified as shown above and hereto attached:

NOW THEREFORE, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Contracting Body, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in 2 counterparts.

Witness:

_____
(Contractor: Trade or Corporate Name)

_____
(Proprietorship or Partnership)

By: _____

Attest: (Corporation)

Title:_____

(Owner, Partner, or Corp. Pres. or Vice Pres. Only)

By: _____

Title: _____
(Corp Sec or Ass't Sec Only)

(Corporate Seal)

_____
(Surety Company)

Witness:

By: _____

_____

Title: _____
(Attorney in Fact)

Countersigned:

(Surety Corporate Seal)

_____
_____

(N.C. Licensed Agent)

_____
_____
_____
(Name and Address - Surety Agency)

_____
_____
_____

(Surety Company Name and NC
Regional or Branch Office
Address)

PAYMENT BOND

Date of Contract:_____

Date of Execution:_____

Name/Address of Principal:_____

_____

Name/Address of Surety:_____

_____

Name/Address of Contracting Body:_____

_____

Amount of Bond (Printed):_____

Project: **NC VETERANS PARK PHASE II**

KNOW ALL MEN BY THESE PRESENTS, that we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the above named Contracting Body, hereinafter called the Contracting Body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract with the Contracting Body, identified as shown above and hereto attached:

NOW THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in 2 counterparts.

Witness:

_____
(Contractor: Trade or Corporate Name)

_____
(Proprietorship or
Partnership)

By: _____

Attest: (Corporation)

Title:_____

(Owner, Partner, or Corp. Pres.
or Vice Pres. Only)

By: _____

Title:_____

(Corp Sec or Ass't Sec Only)

(Corporate Seal)

_____

(Surety Company)

Witness: By: _____

_____ Title: _____

(Attorney in Fact)

Countersigned:

_____ (Surety Corporate Seal)

_____

(N.C. Licensed Agent)

_____

_____

_____

(Name and Address - Surety Agency)

_____

_____

_____

(Surety Company Name and NC
Regional Or Branch Office
Address)

POWER OF ATTORNEY

(ATTACH)

CERTIFICATE(S) OF INSURANCE

(ATTACH)

NOTICE TO PROCEED

TO: _____ DATE: _____

Project: NC Veterans Park Phase II

You are hereby notified to commence work in accordance with the Contract dated _____, on _____, and you are to complete the WORK on _____.

CITY OF FAYETTEVILLE, NORTH CAROLINA

BY: _____
Kimberly Toon
Purchasing Manager

ACCEPTANCE OF NOTICE
Receipt of the above NOTICE TO PROCEED

is hereby acknowledged this the _____ day of __, 2026.

(CONTRACTOR)

BY: _____

TITLE: _____

SECTION C – ADMINISTRATIVE PROVISIONS

DEFINITION OF TERMS
INSTRUCTIONS TO BIDDERS
CONTRACT REQUIREMENTS AND GENERAL CONDITIONS
REQUIRED FORMS (POST-AWARD)
GENERAL STATUTES GUIDELINES

DEFINITION OF TERMS

The contract documents consist of the Notice to Bidders, Instructions to Bidders, the General Construction Contract, Special Conditions if applicable; the Drawings and Specifications, including all bulletins, addenda, or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the Proposal; the Performance Bond; the Payment Bond; and Insurance Certificates. All of these items together form the contract.

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

1. City/Owner - The City of Fayetteville, North Carolina

2. City Council - The Mayor - City Council of the City of Fayetteville, NC

3. City Attorney - The legal counsel employed by the City.

4. Contracting Officer - The City representative; acting directly or through an assistant fully authorized to handle the administration of all City Contracts.

5. Engineer - The City Engineer acting directly or through an assistant or other representative fully authorized to handle all technical aspects of City Contracts.

6. Project Engineer - An authorized representative of the City Engineer assigned to make any and all necessary inspections of the work performed and materials furnished by the Contractor.

7. Bidder - Any individual, firm, partnership, or corporation submitting a proposal of the work contemplated.

8. Contractor - The individual, firm, partnership, or corporation that is awarded the contract based on their bid.

9. Superintendent - The Contractor's executive representative who is present on the work during progress, authorized to receive and fulfill instructions from the engineer or his designee, and who shall supervise and direct the construction.

10. Surety - The corporate body which is bound with and for Contractor, who is primarily liable and which engages to be responsible for the Contractor for his acceptable performance of the work for which he has contracted.

11. Proposal/Bid Guaranty - The security designated in the proposal of good faith to enter into a contract with the City of Fayetteville, North Carolina, if the work of constructing the project is awarded to a Bidder.

12. Plans - All drawings or reproductions of drawings pertaining to the construction of the work contemplated and its appurtenances.

13. Specifications - The description, provisions, and requirements contained herein, together with all written agreements made or to be made pertaining to the method and manner of performing the work, or to the quantities and qualities of materials to be furnished under the contract.

14. Change Order - A written order to the Contractor subsequent to the signing of the contract authorizing a change in the contract. The change order shall be signed by the Contractor, a City representative and Contracting Officer.

15. Surety Bond - The approved form of security furnished by the Contractor and his surety as a guarantee of good faith on the part of the Contractor to execute the work in accordance with the terms of the Contract.

16. Street - The whole right-of-way between building lines or property lines.

17. Roadway - That portion of the street included between curbs or the equivalent.

18. Sidewalk and Tree Space - That portion of the street between the curb and property line or right-of-way.

19. A.S.T.M. - American Society for Testing Materials.

20. Work - The furnishing of all labor, materials, tools, equipment, and incidentals necessary or convenient to the Contractor's performance of all duties and obligations imposed by the contract, plans and specifications.

21. Calendar Day - A calendar day shall be any day inclusive of a legal holiday, Saturday, or Sunday on which the normal working forces of the Contractor may proceed with regular work on the contract. Unless work is suspended for causes beyond the Contractor's control, regular work requiring the presence of the superintendent, will be considered as a calendar day.

22. Intention of Terms - Whenever in these specifications or on the plans, the words "directed," "required," or words of the like import are used, it shall be understood that the requirement of the engineer is intended; and similarly, the words "approved", "acceptable", or words of like import, shall mean approved by, or acceptable to the engineer, subject in each case to the final determination of the City.

INSTRUCTIONS TO BIDDERS

1. PROPOSAL

Proposals shall be made in strict accordance with the "Bid Proposal Package" provided herein, and all blank spaces for bids, alternates and unit prices shall be properly filled in. When requested alternates are not bid, the proposal may be considered incomplete. Any modifications to the "Bid Proposal Package" (including alternates and/or unit prices) will disqualify the bid and shall cause the bid to be rejected.

The Bidder agrees that the "Bid Proposal Package" detached from specifications will be considered and will have the same force and effect as if attached thereto. Photocopied or faxed proposals will not be considered. Numbers shall be stated both in writing and in figures for the base bids and alternates.

Unit prices quoted in the "Bid Proposal Package" shall include overhead, profit and taxes and shall be the full compensation for the Bidder's cost involved in the work.

Proposals may be rejected if they show omissions, alterations of form, additions not called for, conditional bids, or irregularities of any kind.

2. EXAMINATION OF CONDITIONS

By submitting a bid, the Bidder is affirming that he has carefully examined all documents pertaining to the work, the location, accessibility and general character of the site of the work and all existing buildings and structures within and adjacent to the site, and has satisfied himself as to the nature of the work, the condition of existing buildings and structures, the conformation of the ground, the character, quality and quantity of the material to be encountered, the character of the equipment, machinery, plant, and any other facilities needed preliminary to and during prosecution of the work, the general and local conditions, the construction hazards, and all other matters, including but not limited to the labor situation which can in any way affect the work under the contract, and including all safety measures required by the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto. The Bidder further affirms by submitting a proposal that he has satisfied himself as to the feasibility and meaning of the plans, drawings, specifications, and other contract documents for the construction of work and that he accepts all the terms, conditions and stipulations contained therein, and that he is prepared to work in cooperation with other Contractors performing work on the site.

Reference is made to contract documents for the identification of those surveys and investigative reports of subsurface or latent physical conditions at the site or otherwise affecting performance of the work which have been relied upon by the Designer in preparing the documents. The City will make copies of all such surveys and reports available to the Bidder upon request. Each Bidder may, at his own expense, make such additional surveys and investigations as he may deem necessary to determine his bid price for the performance of the work. Any on-site investigation shall be done at the convenience of the City. Any reasonable request for access to the site will be honored by the City.

3. FAMILIARITY WITH LAWS

The bidder is assumed to have made himself familiar with all laws, ordinances, and regulations which in any manner affect those engaged or employed in the work or the materials or equipment used in or upon the work, or in any way affects the conduct of the work.

4. PREPARATION OF PROPOSAL

The bidder must submit his bid proposal on the blank forms herewith provided, and prices must be given both in writing and in figures (if requested). The bidder shall sign his proposal correctly. If the proposal is made by an individual, his name and address must be shown. If made by a corporation, the person signing

shall state under the laws of what state the corporation was chartered, the location of the home office, and the name and title of officers having authority under the bylaws to sign contracts.

5. LICENSING

The successful Contractor must be properly licensed to do the work in accordance with the North Carolina General Statutes (Chapter 87, Article 1). Upon request, bidders shall show evidence of proper license type and limitation.

6. BULLETINS AND ADDENDA

Any addenda to specifications issued during the time of bidding are to be considered covered in the proposal and in closing a contract they will become a part thereof. It shall be the Bidder's responsibility to ascertain prior to bid time the addenda issued and to see that his bid includes any changes thereby required.

Should the bidder find discrepancies in, or omission from, the drawings or documents or should he be in doubt as to their meaning, he shall at once notify the Contracting Office who will send written instructions in the form of addenda to all bidders. Notification should be no later than seven (7) days from the date set for receipt of bids. Neither the City nor the Purchasing Office will be responsible for any oral instructions. All addenda shall be acknowledged by the Bidder(s) on the Proposal Form.

7. BID SECURITY

Each proposal shall be accompanied by a cash deposit, certified check or cashier's check drawn on a bank or trust insured by the Federal Deposit Insurance Corporation, payable to the City of Fayetteville in an amount equal to not less than 5 percent of the proposal, or in lieu thereof a bidder may offer a bid bond in the amount of 5 percent of the bid executed by a surety company licensed under the laws of the State of North Carolina to execute the contract in accordance with the bid bond and upon failure to make payment, the surety shall pay the oblige an amount equal to the amount of said bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or give satisfactory surety as required by law.

8. DELIVERY OF PROPOSAL

Each proposal must be submitted in a sealed opaque envelope so marked as to indicate its contents, project number, project title, bidder's name, address, contractor's license number and status. Bids may be mailed to the City of Fayetteville Purchasing Department, Attn: Kimberly Toon, Purchasing Manager, 433 Hay Street, Fayetteville, NC 28301, or may be delivered in person or by express mail to the City of Fayetteville Purchasing Department, Attn: Kimberly Toon, 433 Hay Street, Fayetteville, NC 28301.

The City of Fayetteville will not be responsible for picking up bids at the post office. Bids arriving after the hour designated for opening shall not be considered.

9. RECEIPT OF BIDS

Bids shall be received in strict accordance with requirements of the General Statutes of North Carolina.

10. WITHDRAWAL OF PROPOSAL

If the bidder desires to withdraw his proposal, he must do so before the time fixed for the receipt of bids, without prejudice to himself by communicating his purpose in writing to the City, and when received it shall be handed to him or to his authorized agent unread. Bids may not be withdrawn after the time for receipt for a period of ninety (90) days.

11. BID OPENING

Bids will be publicly opened and read at **2:00 p.m., September 23, 2026**, in the City Hall Building, 433 Hay Street, EE Smith Conference Room, Fayetteville, North Carolina 28301. Bidders or

their authorized agents are invited to be present. Upon opening, all bids shall become the property of the City. Bids will not be returned to the Bidder.

12. BID EVALUATION

A. RESPONSIVENESS DETERMINATION

Before awarding a contract, the City will first determine whether each bid is "responsive." A responsive bid must:

(1) Be submitted on the required Bid Proposal Package form provided in this ITB;
(2) Include all required signatures, acknowledgments, and certifications;
(3) Be received at the designated location by the time and date specified;
(4) Include all required submittals listed in the Bid Form Submittal Checklist (page 7), including:
- Signed Non-Collusion Affidavit
- Certificate of Insurance
- Certification regarding Debarment and Suspension
- List of Subcontractors
- Bid Bond (5% of bid amount)

(5) Acknowledge all addenda issued during the bidding period;
(6) Provide unit prices and total bid amount for all bid items with no blank spaces, alterations, or conditional pricing;
(7) Be free from material mathematical errors that affect the bid ranking;

Bids that fail to meet these responsiveness criteria may be rejected as non-responsive. The City may waive minor informalities or irregularities that do not affect the bid price or give a bidder a competitive advantage.

B. RESPONSIBILITY DETERMINATION

After determining responsiveness, the City will evaluate whether the apparent low bidder is "responsible" by requiring the bidder to qualify themselves by furnishing the documentary data listed below within five (5) business days of request:

(1) An up-to-date financial statement or other documentation showing assets and liabilities of the Company (Appendix F - Certification of Financial Condition);

(2) A listing of three (3) completed projects of similar scope and nature within the last five (5) years, including:
- Project name, location, and description
- Owner contact information
- Contract value
- Completion date
- Bidder's role in the project

(Complete and submit all applicable appendices and forms included in this solicitation.)

(3) Permanent name and address of place of business;

(4) The number of employees of the organization and length of time the organization has been in business under the present name;

(5) Appropriate North Carolina contractor's license:
- Unlimited license for contracts exceeding $500,000, OR
- Appropriate limited license for lesser amounts
- License number and expiration date

- Pursuant to North Carolina General Statute Chapter 87, Article 1

(6) Ability to obtain required Performance and Payment Bonds:
- Each bond must equal 100% of contract amount
- From a surety authorized to do business in North Carolina
- Surety must be acceptable to the City Attorney
- Pursuant to NC G.S. Chapter 44A, Article 3

(7) Ability to obtain required insurance coverage as specified in the General Construction Contract, Article 4;

(8) The name and address of the surety proposed and the name and address of the responsible local adjuster for insurance claims;

(9) The names of members of the firm who hold appropriate trade licenses, together with license numbers;

(10) An affidavit stating whether or not any OSHA violations have occurred within the past three (3) years, including:
- Nature of violations
- Corrective actions taken
- Current status

(11) Demonstrated ability to comply with Section 3 requirements, including:
- Understanding of Section 3 worker and Targeted Section 3 worker definitions
- Good faith plan to achieve 25% Section 3 worker and 5% Targeted Section 3 worker benchmarks
- Plan for outreach to Section 3 workers and Section 3 Business Concerns
- Understanding of prioritization of effort requirements

(12) Confirmation that the bidder is not debarred, suspended, or otherwise excluded from participation in federal assistance programs as listed in the System for Award Management (SAM) at www.SAM.gov

(13) Satisfactory references from owners of similar projects demonstrating:
- Quality of workmanship
- Adherence to schedule
- Professional conduct
- Safety record
- Compliance with contract requirements

Failure or refusal to furnish any items of information requested by the City shall constitute a basis for disqualification of any bidder.

C. EVALUATION FACTORS

The City will evaluate bids based on the following factors:

(1) PRIMARY FACTOR: Total bid price (lowest responsive, responsible bidder)

(2) SECONDARY FACTORS (for responsibility determination):
- Financial capacity and stability
- Experience with similar projects (heavy construction, asphalt paving, sports facilities)
- Technical competence and qualifications
- Capacity to perform (equipment, personnel, availability)

- Past performance record
- Compliance history (safety, quality, schedule adherence)

D. NON-RESPONSIBILITY DETERMINATION

Should the City determine that the apparent low bidder is not the lowest responsible bidder by virtue of the information requested above, said apparent low bidder will be notified in writing of the specific reasons for the non-responsibility determination. The bidder's bid security shall be returned.

The City may then evaluate the next lowest bidder for responsibility. Should the next lowest bidder also be determined non-responsible, the process continues until a responsive, responsible bidder is identified.

Should the successful bidder default and fail to execute a contract, the bid security shall be forfeited at the sole discretion of the City, and the contract may be awarded to the next lowest responsive and responsible bidder.

E. AWARD BASIS

Award will be made to the lowest responsive, responsible bidder whose bid, conforming to the Invitation to Bid, is most advantageous to the City, price and other factors considered.

The City reserves the right to:
- Reject any or all bids
- Waive minor informalities or irregularities
- Request clarifications from bidders
- Verify bidder qualifications through independent sources
- Postpone or cancel the award
- Award to other than the apparent low bidder if that bidder is determined to be non-responsible

F. TIE BIDS

In the event of identical bid amounts from two or more responsive, responsible bidders, the contract will be awarded using the following methods in order:

In a tie bid scenario, the public agency can award the contract based on **criteria in addition to the price**, such as quality, performance, and the time specified for completion.

G. UNBALANCED BIDS

The City reserves the right to reject any bid determined to be unbalanced. A bid may be considered unbalanced if:

(1) Unit prices for some items are significantly higher or lower than the City's estimate or industry standards;
(2) The bidder appears to be "front-loading" early items or "back-loading" later items;
(3) The pricing strategy appears designed to:
- Generate excessive early payments
- Take advantage of anticipated changes
- Shift risk inappropriately to the City

In the event that an unbalanced bid is determined to be the lowest bid, the City reserves the right to:

- Request a detailed breakdown and justification of unit prices
- Negotiate adjustments to disputed line items
- Reject the bid as non-responsive
- Award to the next lowest responsive, responsible bidder

H. MATHEMATICAL ERRORS

(1) If there is a discrepancy between unit prices and extended totals, the unit price shall govern.

(2) If there is a discrepancy between written and numerical amounts, the written amount shall govern.

(3) If an error in calculation is discovered that affects the bid ranking, the City may:
- Allow the bidder to withdraw the bid without penalty, OR
- Allow correction if the error is clearly evident from the face of the bid documents

(4) Bidders may not withdraw or modify bids due to errors in judgment or estimate.

I. DISQUALIFICATION

In addition to the disqualification reasons stated in Section 14 (Disqualification of Bidders), bids may be rejected for:

(1) Evidence of collusion among bidders
(2) Conflict of interest
(3) Failure to meet licensure requirements
(4) Listing on federal or state debarment lists
(5) Material misrepresentation in qualification documents
(6) Failure to demonstrate financial capacity
(7) Unsatisfactory past performance on similar projects
(8) Inability to meet insurance or bonding requirements

J. RESERVATION OF RIGHTS

The City reserves the right to make awards in the best interest of the City. This includes the right to:

(1) Accept or reject any or all bids;
(2) Waive technicalities and minor irregularities;
(3) Negotiate with any responsive, responsible bidder;
(4) Award the contract to other than the low bidder;
(5) Terminate the procurement process;
(6) Request additional information or clarification;
(7) Conduct investigations of bidders' qualifications;
(8) Make awards by item, group of items, or total bid as deemed in the City's best interest.

The submission of a bid does not create any rights in the bidder. The City is not obligated to award a contract based on this solicitation.

K. PROTEST PROCEDURES

Any bidder who wishes to protest the City's decision must submit a written protest to the City Manager within five (5) business days of notification of award. The protest must:

(1) Be in writing and signed by an authorized representative;
(2) Identify the specific grounds for protest;
(3) Include all supporting documentation;
(4) Be delivered to:
City Manager
City of Fayetteville
433 Hay Street
Fayetteville, NC 28301

13. The City Manager's decision on the protest shall be final. MATERIAL GUARANTEE

Before the award of contract, the successful bidder, when requested, shall furnish a complete statement of the origin, composition, and manufacturer of any and all materials to be used in the construction of the project together with samples, which samples may be subjected to the tests provided for in these specifications to determine their quality and fitness for the work. All materials furnished must meet or exceed quality required by the latest specifications of the North Carolina State Construction Office.

14. DISQUALIFICATION OF BIDDERS

More than one proposal from an individual, a firm or partnership, a corporation, or an association under the same or different names will not be considered. Reasonable grounds for believing that any bidder is interested in more than one proposal for the work contemplated will cause the rejection of all proposals in which such bidder is interested. Any or all proposals will be rejected if there is reason for believing that collusion exists among the bidders, and all participants in such collusion will not be considered in future

proposals for the same work. No contract will be awarded except to competent bidders capable of performing the class of work contemplated.

15. UNBALANCED BIDS

The City reserves the right to reject any bid determined to be unbalanced. In the event that an unbalanced bid is determined to be the lowest responsible bid, the City reserves the right to request negotiation of the particular line item(s) disputed.

16. RIGHT TO REJECT PROPOSALS

The City reserves the unqualified right to reject any and all bids. Reasons for rejection may include, but shall not be limited to, the following:

a. If the "Bid Proposal Package" furnished to the bidder is not used or is altered.

b. If the bidder fails to insert a price for all bid items, alternate and unit prices requested.
c. If the bidder adds any provisions reserving the right to accept or reject any award.

d. If there are unauthorized additions or conditions to the bid or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning.

e. If the bidder fails to complete the proposal form where information is requested so the bid may be properly evaluated by the City.

f. If the unit prices contained in the bid are unacceptable to the City.

g. If the bidder fails to comply with other instructions stated herein.

CONTRACT REQUIREMENTS AND GENERAL CONDITIONS

The general conditions governing performance of the Work are those set forth in the City of Fayetteville General Construction Contract included in Section B and incorporated into this solicitation by reference. Bidders shall review the General Construction Contract in full before submitting a bid and shall base their bids on its terms.

Without limiting the foregoing, the General Construction Contract governs: insurance and bond requirements; contract time, liquidated damages, and extensions of time; schedule and submittal requirements; change orders and claims; progress payments, retainage, and final payment; warranties; suspension and termination; disputes; site management, safety, and environmental compliance; and required regulatory certifications.

Retainage on this project shall be withheld and released solely as provided in the General Construction Contract and N.C. Gen. Stat. § 143-134.1.

In the event of a conflict, inconsistency, or ambiguity between this solicitation and the General Construction Contract, the order of precedence stated in the General Construction Contract shall control.

REQUIRED FORMS (POST AWARD)

Change Order	See General Construction Contract, Article 9
Standard Form for Payment Requests	See General Construction Contract, Article 10
Sales & Use Tax Certificate	See General Construction Contract, Article 10
Claims for Extra Cost/Time	See General Construction Contract, Article 20
Release of Claims	See General Construction Contract, Article 10

FAYETTEVILLE NC AMERICA'S CAN DO CITY **Purchasing Department** **433 Hay Street** **Fayetteville, NC 28301** **(910) 433-1942** **(910) 433-1680 (FAX)**	**CITY OF FAYETTEVILLE** **CONTRACT CHANGE ORDER**	**Project: NC Veterans Park Phase II**
	Contractor: **Address:**	
Effective Date: **Contract No.:** **Change Order No.:** **Account No.:**	**Previous Total:** **Change: Revised Total:** **Time Change:**	
This change order is being written to: **Except as provided herein, all terms and conditions of the contract referenced above, as heretofore changed remains unchanged and in full force and effect.**		
Contractor Acceptance: **I certify that my bonding company will be notified forth-with that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety.** **By:_____** **(Signature/Date)**	**City Acceptance:** **This instrument has been pre-audited in the manner required by the Local Government and Budget Fiscal Control Act.** _____ _____ **Chief Financial Officer (Signature/Date)**	
Type or Print Name	_____ _____ **Contracting Officer (Signature/Date)**	
Title	_____ _____ **Authorized City Representative (Signature/Date)**	

STANDARD FORM FOR PAYMENT REQUESTS

Company Name**:** Project Name: **NC Veterans Park Phase II**

Company Address: Project Number:

Company Phone:

Pay Request #

PART A

ITEM#	DESCRIPTION	SCHEDULED QUANTITY	UNIT PRICE	SCHEDULED VALUE	PREVIOUS QTY	CURRENT QTY	TOTAL VALUE
1.							
2.							
3.							
4.							
		SUB-TOTAL		SUB-TOTAL			

PART B

ITEM#	DESCRIPTION	SCHEDULED QUANTITY	UNIT PRICE	SCHEDULED VALUE	PREVIOUS QTY	CURRENT QTY	TOTAL VALUE
1.							
2.							
3.							
4.							

SUB-TOTAL	SUB-TOTAL
TOTAL EARNINGS	$
CONTRACT SUMMARY	
Original Contract Value	$
Change Orders Approved	$
Current Contract Value	$
Total Earnings	$
Less Retainage	$
Less Previous Payments	$
Due this estimate	$
Balance to finish (+ retainage)	$

PROJECT TITLE: NC Veterans Park Phase II

App #_____

SALES/USE TAX CERTIFICATE

(Use as many sheets as needed/sign affidavit of last sheet per pay estimate)

Analysis of consumed material **Manufactured or Purchased** by you. Sales and/or Use Tax Regulation Number 41 requires that the City of Fayetteville secure from each contractor certified statements setting forth the cost of the materials and supplies manufactured or purchased by you and consumed in construction. This form is provided for you to list the materials consumed in construction. Please complete this form by inserting the information required below.

Vendor Name Paid	Date Purchased	Invoice Number	Amount Less Tax	Sales Tax 4.75% State/2.25% Local	Invoice County Total

_____ / _____

_____ / _____

_____ / _____

_____ / _____

_____ / _____

_____ / _____

_____ / _____

$ _____ $ _____ $ _____ $ _____

AFFIDAVIT

This is to certify that sales/use tax was or will be paid as stated above on materials and supplies purchased or manufactured by the **City of Fayetteville, North Carolina,** for the above mentioned project during the period and billed on this payment application #_____.

_____	_____
(Contractor)	**(Authorized Signature/Date)**
_____	_____
(Address)	**(Telephone Number)**
_____	_____
(City, State, Zip)	**(Fax Number)**

Date:_____ **Page**_____**of** _____

FAYETTEVILLE NC AMERICA'S CAN DO CITY **Purchasing Department** **433 Hay Street** **Fayetteville, NC 28301** **(910) 433-1942**	**CLAIM FOR EXTRA COST/TIME** **PROJECT TITLE: NC Veterans Park Phase II** **Contractor:** **Fax:**

CLAIM is made for_____additional dollars/_____additional days for the following reason:

By:_____ Title:_____
Phone:_____ Date:_____

ACCEPTED/DENIED

By:_____ Title:_____
Phone:_____ Date:_____

If Denied, Explanation or Counter proposal:

Counter Proposal Accepted/Denied
City/Contractor

By_____ Title:_____
Phone:_____ Date_____

RELEASE OF CLAIMS

Contract/Purchase Order Number:_____

Title: NC Veterans Phase Park II

Project Number: _____

To the best of my knowledge and belief, I certify that all items, units, quantities, prices of work and materials and NC Sales taxes shown on the attached final invoice are correct; that all work has been performed and materials supplied in accordance with the terms and conditions of the above stated contract, including any and all change orders, between the City of Fayetteville, and (Contractor) _____. I further certify that all subcontracting obligations have been met. Below is a true and correct statement of the contract amount up to and including the last day of the period covered by the attached final invoice, and that no part of the "total amount due" has been received.

(a) Total Contract Cost (Including Change Orders) $_____
(b) Total Amount Previously Paid $_____
(c) Total Amount Due (Including retainage) $_____

In consideration of the above stated sum to be paid by the City of Fayetteville for the noted contract, the undersigned contractor does release and discharge the City of Fayetteville, its officers, agents and employees, of and from all liabilities, obligations and claims whatsoever in law and equity arising out of or by virtue of said contract, except specified claims in stated amounts, or in estimated amounts when the amounts are not susceptible of exact statement by the contractor, as follows:

_____

_____

_____

IN WITNESS WHEREOF, this release has been executed this_____day of_____, 2022 (Imprint Corporate Seal below this line)

(CONTRACTOR) BY:_____
TITLE:_____

ATTEST:

_____
(Secretary)

ENGINEERING CERTIFICATION OF CHARGES

I certify this_____day of_____, 2026 that the attached final invoice is correct for payment, and that to the best of my knowledge and belief, it is a true and correct statement of work performed and materials supplied in accordance with the terms and conditions of the above noted contract.

CITY OF FAYETTEVILLE, NC

BY_____

TITLE_____

GENERAL STATUTES GUIDELINES

All Prospective Bidders are Hereby Advised to Become Familiar with Certain Provisions of the General Statutes of North Carolina. The following list is furnished for your information and is not meant to be all-inclusive. Full compliance of the **Current** General Statutes of North Carolina applicable to this contract shall be required from all bidders.

Chapter 44A, Article 3	Payment and Performance Bonds.
Chapter 87	Contractors.
Chapter 95, Article 16	Occupational Safety and Health Act of North Carolina
Chapter 113A, Article 1	Pollution Control and Environment.
Chapter 130A, Article 19	Asbestos Hazard Management.
Chapter 132	Public Records.

Chapter 143, Article 8 Public Contracts. Note: G.S. 143-128.2, 143-128.3, and 143-128.4, governing the State Historically Underutilized Business program, were repealed by S.L. 2026-41 effective July 1, 2026, and no HUB participation requirement applies to this solicitation.

Chapter 143, Article 21	Water and Air Resources.
Chapter 143, Article 21B	Air Pollution

Chapter 22B Contracts Against Public Policy (indemnity, venue, jury trial waiver, lien waivers).

Chapter 64, Article 2 Verification of Work Authorization (E-Verify).

Chapter 143, Article 8 G.S. 143-133.3, E-Verify requirement for public contracts.

Chapter 147, Article 6E Divestment from Companies Investing in Iran.

Chapter 147, Article 6G Divestment from Companies Boycotting Israel.

Chapter 14 G.S. 14-234, Public Officers or Employees Contracting with Own Agency.

Chapter 133 G.S. 133-32, Gifts and Favors Regulated.

Chapter 159, Article 3 Local Government Budget and Fiscal Control Act (pre-audit).

APPENDIX A

PLACEHOLDER

DIVISION 01 (GENERAL REQUIREMENTS) &

DIVISION 02 - DIVISION 33 (TECHNICAL SPECIFICATIONS)

APPENDIX A

NC VETERANS PARK II
CITY OF FAYETTEVILLE

FAYETTEVILLE, NORTH CAROLINA

OWNER:
CITY OF FAYETTEVILLE
FAYETTEVILLE NORTH CAROLINA

DESIGNER:
RATIO Design

RATIO

RATIO PROJECT NO. 19097.000

01/26/2026

BID SET

DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Landscape Architect:
   1. RATIO Design
   2. 227 Fayetteville Street, Suite 301
      Raleigh, NC 27601
   3. 919.821.0805



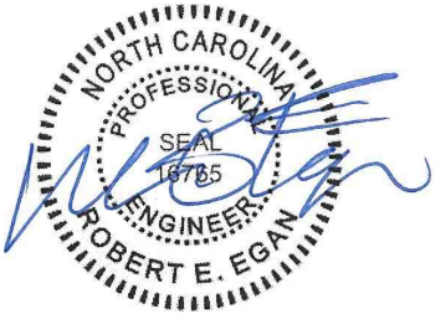
Lisa Esterrich

B. Civil Engineer / Environmental:
   1. GFT Infrastructure, Inc.
   2. 1 Glenwood Avenue, Suite 600
      Raleigh NC 27603
   3. 919.789.9977



Jesse Lindsay

C. Electrical Engineer:
   1. The Wooten Company
   2. 120 North Boylan Avenue
      Raleigh, North Carolina 27603
   3. Phone: (919) 828-0531



Robert Egan

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NOT APPLICABLE

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NOT APPLICABLE

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NOT APPLICABLE

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NOT APPLICABLE

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NOT APPLICABLE

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NOT APPLICABLE

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SECTION 011000 - SUMMARY

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:

1. Project information.
2. Work covered by Contract Documents.
3. Contractor's use of site and premises.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.4 PROJECT INFORMATION

A. Project Identification: North Carolina Veterans Park II

1. Project Location: 300 Bragg Blvd, Fayetteville, NC, 28301.

B. Owner: City of Fayetteville

1. Owner's Representative: Dr. Doug Hewett, City Manager

C. Architect: RATIO

1. Architect's Representative: Lisa Esterrich, PLA

D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:

1. Civil Engineer: GFT, Inc.
2. Electrical Engineer: The Wooten Company
3. Landscape Architect: RATIO

E. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. This package includes earthwork, stormwater conveyance, drainage, asphalt paving, concrete paving, cast-in-place concrete, planting, irrigation design, irrigation, lighting, and other Work indicated in the Contract Documents.

B. Type of Contract:

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

1.6 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
2. Provide for delivery of Owner-furnished products to Project site.
3. Upon delivery, inspect, with Contractor present, delivered items.

a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.

4. Obtain manufacturer's inspections, service, and warranties.
5. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:

1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
3. Receive, unload, handle, store, protect, and install Owner-furnished products.
4. Make building services connections for Owner-furnished products.
5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
6. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished/Contractor-Installed (OFCI) Products:

1. Various site furnishings as indicated on Drawings.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

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

B. Restricted Use of Site: Each Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

C. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits on Use of Site: Confine construction operations to established project limits..
2. Driveways, Walkways and Entrances: Keep driveways parking garage, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.8 COORDINATION WITH OCCUPANTS

A. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.9 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to hours established by Owner, Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

C. On-Site Work Day Restrictions: Do not perform work resulting in utility shutdowns or resulting in noisy activity on-site during work black-out days indicated in Contract Documents.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site on Owner's property is not permitted.

F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

A. The Contract Documents are complementary, and what is called for by any one document shall be as binding as if called for by all. The intention of the documents is to include all labor, materials, equipment, and transportation necessary for the proper execution of the Work. Words describing materials or work which have a well-known technical or trade meaning shall be held to refer to such recognized standards.
   1. Should apparent contradictions occur between the various Contract documents, submit a Request for Interpretation in accordance with the requirements of Division 01 Section "Project Management and Coordination" for clarification.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
   3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
   4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

C. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

D. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

E. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard.
   3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012200 - 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 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as 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.

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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 1: Removal of excess soil.

1. Description: Unsatisfactory soil excavation according to Section 312000 "Earth Moving." includes hauling and disposal to off-site at location designated by City - Milan Yards,
2. Unit of Measurement: Cubic yard of soil excavated, based on in-place surveys of volume before and after removal.

B. Unit Price No. 2: Amendment of unsatisfactory soil material.

1. Description: Unsatisfactory soil amendment, according to Section 329113 "soil preparation." (Removing the soil, tilling, providing the amendments, physically incorporating then re-spreading)
2. Unit of Measurement: Cubic yard (Cubic meter) of soil amended, based on in-place surveys of volume before and after removal.

END OF SECTION

SECTION 012300 - 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 the 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 alternates 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. Execute accepted alternates under the same conditions as other work of the Contract.

C. 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 1: Hillsboro Street Parking Lot
   1. Provide alternate to provide additional parking including all associated grading, lighting, curbing, signage, pavement markings as specified on plans.

B. Alternate 2: Trail Connection
   1. Provide additional asphalt pavement walking trail connection between concrete gathering areas.

C. Alternate 3: Monument Sign
   1. Provide cast-in-place concrete wall w/ varied finishes; signage/address lettering and cast bronze reliefs to be incorporated into face of wall.

END OF SECTION

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710 or similar form.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

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

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 or similar form. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012200 "Unit Prices" for administrative requirements governing the use of unit prices.
2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

    a. Project name and location.
    b. Name of Architect.
    c. Architect's Project number.
    d. Contractor's name and address.
    e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703 or similar form.
3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

    a. Related Specification Section or Division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

        1) Labor.
        2) Materials.
        3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site.

6. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
7. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.

8. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
9. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

C. Application for Payment Forms: Use or similar form as form for Applications for Payment.

1. Other Application for Payment forms proposed by the Contractor shall be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.

2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Schedule of unit prices.
7. Submittal schedule (preliminary if not final).
8. List of Contractor's staff assignments.

9. List of Contractor's principal consultants.
10. Copies of building permits.
11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
12. Initial progress report.
13. Report of preconstruction conference.
14. Certificates of insurance and insurance policies.
15. Performance and payment bonds.
16. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, in web-based Project software directory, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and scheduled activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
b. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
e. Indicate required installation sequences.
f. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
3. Mechanical and Plumbing Work: Show the following:

    a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.

4. Electrical Work: Show the following:

    a. Runs of vertical and horizontal conduit 1-1/4 inches in diameter and larger.
    b. Panel board, switch board, switchgear, transformer, busway, generator, and motor-control center locations.
    c. Location of pull boxes and junction boxes, dimensioned from column center lines.

5. Review: Architect will review coordination drawings to confirm that in general the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
6. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

1.7 REQUEST FOR INFORMATION (RFI)

A. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

B. RFI Forms: AIA Document G716 or Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in PDF format.

C. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.

D. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

E. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Use of Architect's Digital Data Files: Digital data files of Architect's CAD file will be provided by Architect for Awarded Contractor's use during construction.

1. Digital data files may be used by Contractor in preparing coordination drawings, and Project record Drawings.
2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
3. Digital Drawing Software Program: Contract Drawings are available in Autodesk AutoCad.
4. Subcontractors, and other parties granted access by Awarded Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual

B. Web-Based Project Software: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion.

1. Web-based Project software site includes, at a minimum, the following features:

   a. Compilation of Project data, including Contractor, subcontractors, Architect, architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
   b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
   c. Document workflow planning, allowing customization of workflow between project entities.
   d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
   e. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
   f. Processing and tracking of payment applications.
   g. Processing and tracking of contract modifications.
   h. Creating and distributing meeting minutes.
   i. Document management for Drawings, Specifications, and coordination drawings, including revision control.
   j. Management of construction progress photographs.
   k. Mobile device compatibility, including smartphones and tablets.

2. Provide up to seven web-based Project software user licenses for use of Owner, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
4. Provide one of the following web-based Project software packages under their current published licensing agreements:

   a. Autodesk; Buzzsaw or Constructware.
   b. Corecon Technologies, Inc.
   c. Meridian Systems; Prolog.
   d. Newforma, Inc.
   e. Procore Technologies, Inc.
   f. Viewpoint, Inc.; Viewpoint for Project Collaboration.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Use of web-based Project software.
    h. Procedures for processing field decisions and Change Orders.
    i. Procedures for RFIs.
    j. Procedures for testing and inspecting.
    k. Procedures for processing Applications for Payment.

l. Distribution of the Contract Documents.
m. Submittal procedures.
n. Preparation of Record Documents.
o. Use of the premises.
p. Work restrictions.
q. Working hours.
r. Owner's occupancy requirements.
s. Responsibility for temporary facilities and controls.
t. Procedures for disruptions and shutdowns.
u. Construction waste management and recycling.
v. Parking availability.
w. Office, work, and storage areas.
x. Equipment deliveries and priorities.
y. First aid.
z. Security.
aa. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.

q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.
2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of Record Documents.
b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
c. Procedures for completing and archiving web-based Project software site data files.
d. Submittal of written warranties.
e. Requirements for preparing operations and maintenance data.
f. Requirements for delivery of material samples, attic stock, and spare parts.
g. Preparation of Contractor's punch list.
h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
i. Coordination of separate contracts.
j. Owner's partial occupancy requirements.
k. Installation of Owner's furniture, fixtures, and equipment.
l. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

        1) Interface requirements.
        2) Sequence of operations.
        3) Status of submittals.
        4) Deliveries.
        5) Off-site fabrication.
        6) Access.
        7) Site use.
        8) Temporary facilities and controls.
        9) Progress cleaning.
        10) Quality and work standards.
        11) Status of correction of deficient items.
        12) Field observations.
        13) Status of RFIs.
        14) Status of Proposal Requests.
        15) Pending changes.
        16) Status of Change Orders.
        17) Pending claims and disputes.
        18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at regular intervals. Project coordination meetings may be in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
c. Review present and future needs of each contractor present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site use.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of RFIs.
14) Proposal Requests.
15) Change Orders.

16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

Project: Veterans Park II

RATIO Project No.: 19097.000

RATIO and their consultants make project-related electronic data available to you without payment upon the condition that you agree RATIO and their consultants have developed the information for their own use relative to the above-referenced project. The processing of this information to obtain dimensional information is strictly prohibited. RATIO makes no representation, warranties or undertakings of any type concerning the accuracy or completeness of this electronic information or its usefulness in relation to your use of this information. Furthermore, RATIO and their consultants assume no obligation whatsoever to inform you of any additions, deletions, revisions, or corrections of any kind that may be made to these electronic files after you receive them.

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The data will be used only for the specific project listed above. The contractor will remove from all drawings any reference to RATIO or any other members of the design team. None of the data will be used for any other project or purpose, at this or any other site. The recipient may use this data as needed, at their own risk. The recipient will not distribute the data to any other firm or individual, except the recipient's consultants or subcontractors.

You agree to defend, indemnify and hold harmless, RATIO and their consultants from any damage, liability, or costs whatsoever, including attorney's fees, that may be presented to you or by any third party allegedly resulting from use of the electronic data being supplied to you by RATIO, including any claimed inaccuracies or incompleteness of that data, regardless of whether such claims involve the alleged negligence of RATIO, in the preparation of that data.

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Special instructions related to building information models (BIM):
Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors

or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees. Design Intent Building Information Models, used by the Architect and consultants to produce Construction Documents, reach a maximum of LOD 300 and may not reflect as-constructed conditions during the construction phase of the project.

By signature below, the recipient certifies that he/she is an authorized representative of the requesting party and is authorized to enter into this agreement. Release of project information by RATIO is contingent upon receipt of this signed waiver.

Acknowledged and Accepted (Date):
By:
Title:
Company:

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file, where indicated.
2. PDF file.

B. Startup construction schedule.

1. Submittal of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.

2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at monthly intervals.

H. Material Location Reports: Submit at monthly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

1.5 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established for the Notice to proceed to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.

2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use-of-premises restrictions.
    f. Provisions for future construction.
    g. Seasonal variations.
    h. Environmental control.

2. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Mockups.
    e. Fabrication.
    f. Sample testing.
    g. Deliveries.
    h. Installation.
    i. Tests and inspections.
    j. Adjusting.
    k. Curing.
    l. Startup and placement into final use and operation.

3. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

F. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Section 012900 "Payment Procedures" for cost reporting and payment procedures.

G. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

H. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

I. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

J. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.7 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.8 GANTT-CHART SCHEDULE REQUIREMENTS

1. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.9 CPM SCHEDULE REQUIREMENTS

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 60 days after date established for the Notice to Proceed.

a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.

2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.
b. Mobilization and demobilization.
c. Purchase of materials.
d. Delivery.
e. Fabrication.
f. Utility interruptions.
g. Installation.
h. Work by Owner that may affect or be affected by Contractor's activities.
i. Testing and inspection.
j. Punch list and final completion.
k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.

    a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
    b. Total cost assigned to activities shall equal the total Contract Sum.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.10 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.

3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos on thumb-drive or by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in file metadata tag:

a. Name of Project.
b. Name and contact information for photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date photograph was taken.

f. Description of location, vantage point, and direction.
g. Unique sequential identifier keyed to accompanying key plan.

C. Video Recordings: Submit video recordings within seven days of recording.

1. Submit video recordings on thumb drive or by uploading to web-based project software site. Include copy of key plan indicating each video's location and direction.
2. Identification: With each submittal, provide the following information in file metadata tag:

a. Name of Project.
b. Name and address of photographer.
c. Name of Architect.
d. Name of Contractor.
e. Date video recording was recorded.
f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4 FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technolog. Use flash in low light levels or backlit conditions.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode with vibration-reduction technology. Provide supplemental lighting in low light levels or backlit conditions.

C. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

D. Metadata: Record accurate date and time from camera.

E. File Names: Name media files with date, Project area and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs with maximum depth of field and in focus.

1. Maintain key plan with each set of construction photographs that identifies each photographic location.

B. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.

1. Flag construction limits before taking construction photographs.
2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

C. Periodic Construction Photographs: Take 100 photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

D. Final Completion Construction Photographs: Take 100 photographs after date of Substantial Completion for submission as Project Record Documents. will inform photographer of desired vantage points.

E. Additional Photographs: Architect may request photographs in addition to periodic photographs specified.
1. Circumstances that could require additional photographs include, but are not limited to, the following:

a. Special events planned at Project site.
b. Immediate follow-up when on-site events result in construction damage or losses.
c. Photographs to be taken at fabrication locations away from Project site. Substantial Completion of a major phase or component of the Work.
d. Extra record photographs at time of final acceptance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and final completion construction photographs.
5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
9. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

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

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 working days for initial review of each submittal. A submittal received by Architect after 1:00 p.m. will be considered as received the following working day. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 working days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 working days for initial review of each submittal.

5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 working days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

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

1.7 SUBMITTAL REQUIREMENTS

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

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.

2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.

g. Limitations of use.

1.8 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

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

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will discard submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

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 quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for direction before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 ACTION SUBMITTALS

A. Shop Drawings: For mockups.

1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

D. Reports: Prepare and submit certified written reports and documents as specified.

E. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
f. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.

    a. Concrete or Unit Pavement mock-ups when required by Div. 32 Sections shall be located directly adjacent to facade mock-up or completed facade construction to allow for coordinated review.

3. Notify Architectseven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect'sapproval of mockups before starting corresponding work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
8. Demolish and remove mockups when directed unless otherwise indicated.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.

2. Notifying Architectand Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architectwith copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 014200 - REFERENCES

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 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.

14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.
25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/.
51. CEA - Canadian Electricity Association; www.electricity.ca.

52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - Canadian Standards Association; www.csa.ca.
65. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.
67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.

92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. ICBO - International Conference of Building Officials; (See ICC).
101. ICC - International Code Council; www.iccsafe.org.
102. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
103. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
104. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
105. IEC - International Electrotechnical Commission; http://www.iec.ch.
106. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
107. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
108. IESNA - Illuminating Engineering Society of North America; (See IES).
109. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
110. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
111. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
112. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
113. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
114. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
115. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
116. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
117. ISO - International Organization for Standardization; www.iso.org.
118. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
119. ITU - International Telecommunication Union; www.itu.int/home.
120. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
121. LMA - Laminating Materials Association; (See CPA).
122. LPI - Lightning Protection Institute; www.lightning.org.
123. MBMA - Metal Building Manufacturers Association; www.mbma.com.
124. MCA - Metal Construction Association; www.metalconstruction.org.
125. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
126. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
127. MHIA - Material Handling Industry of America; www.mhia.org.
128. MIA - Marble Institute of America; www.marble-institute.com.
129. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
130. MPI - Master Painters Institute; www.paintinfo.com.

131. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
132. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
133. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
134. NADCA - National Air Duct Cleaners Association; www.nadca.com.
135. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
136. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
137. NBI - New Buildings Institute; www.newbuildings.org.
138. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
139. NCMA - National Concrete Masonry Association; www.ncma.org.
140. NEBB - National Environmental Balancing Bureau; www.nebb.org.
141. NECA - National Electrical Contractors Association; www.necanet.org.
142. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
143. NEMA - National Electrical Manufacturers Association; www.nema.org.
144. NETA - InterNational Electrical Testing Association; www.netaworld.org.
145. NFHS - National Federation of State High School Associations; www.nfhs.org.
146. NFPA - National Fire Protection Association; www.nfpa.org.
147. NFPA - NFPA International; (See NFPA).
148. NFRC - National Fenestration Rating Council; www.nfrc.org.
149. NHLA - National Hardwood Lumber Association; www.nhla.com.
150. NLGA - National Lumber Grades Authority; www.nlga.org.
151. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
152. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
153. NRCA - National Roofing Contractors Association; www.nrca.net.
154. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
155. NSF - NSF International; www.nsf.org.
156. NSPE - National Society of Professional Engineers; www.nspe.org.
157. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
158. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
159. NWFA - National Wood Flooring Association; www.nwfa.org.
160. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
161. PDI - Plumbing & Drainage Institute; www.pdionline.org.
162. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
163. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
164. RFCI - Resilient Floor Covering Institute; www.rfci.com.
165. RIS - Redwood Inspection Service; www.redwoodinspection.com.
166. SAE - SAE International; www.sae.org.
167. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
168. SDI - Steel Deck Institute; www.sdi.org.
169. SDI - Steel Door Institute; www.steeldoor.org.
170. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
171. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).

172. SIA - Security Industry Association; www.siaonline.org.
173. SJI - Steel Joist Institute; www.steeljoist.org.
174. SMA - Screen Manufacturers Association; www.smainfo.org.
175. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
176. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
177. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
178. SPIB - Southern Pine Inspection Bureau; www.spib.org.
179. SPRI - Single Ply Roofing Industry; www.spri.org.
180. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
181. SSINA - Specialty Steel Industry of North America; www.ssina.com.
182. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
183. STI - Steel Tank Institute; www.steeltank.com.
184. SWI - Steel Window Institute; www.steelwindows.com.
185. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
186. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
187. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
188. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
189. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
190. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
191. TMS - The Masonry Society; www.masonrysociety.org.
192. TPI - Truss Plate Institute; www.tpinst.org.
193. TPI - Turfgrass Producers International; www.turfgrasssod.org.
194. TRI - Tile Roofing Institute; www.tileroofing.org.
195. UL - Underwriters Laboratories Inc.; www.ul.com.
196. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
197. USAV - USA Volleyball; www.usavolleyball.org.
198. USGBC - U.S. Green Building Council; www.usgbc.org.
199. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
200. WASTEC - Waste Equipment Technology Association; www.wastec.org.
201. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
202. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
203. WDMA - Window & Door Manufacturers Association; www.wdma.com.
204. WI - Woodwork Institute; www.wicnet.org.
205. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
206. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.

3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.

b. Available from General Services Administration; www.gsa.gov.
c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

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 requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

A. General: Installation and removal of for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch , 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top rails.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack and marker boards.
3. Drinking water.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service underground unless otherwise indicated.
2. Connect temporary service to Owner's existing power source, as directed by Owner.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

G. Electronic Communication Service: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:

1. Processor: Intel Core i7 or Xeon
2. Memory: 16GB.
3. Disk Storage: 250 GB or larger SSD Drive and combination DVD-RW/CD-RW drive.
4. Single or Dual display: 23-inch LED Monitor
5. 4GB onboard graphics card
6. Network Connectivity: Gigabit. Wireless-N or AC recommended wireless
7. Operating System: Microsoft Windows 10 Professional or Enterprise
8. Productivity Software:

    a. Microsoft Office Professional, 2016 or higher, including Word, Excel, and Outlook.
    b. Adobe Reader 11.0 or higher, Bluebeam Vu or Revu

9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
10. Internet Service: Cable modem or mobile hotspot with at least 10Mbps upload and download speeds.
11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.

12. Backup: On site external hard drive 2TB that comes with backup software

3.4 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 321216 "Asphalt Paving."

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary parking areas for construction personnel.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide 8 ft by 8 ft Project below identification signs as indicated on Drawings.

    a. Single-sided sign shall be constructed of 3- 6 in. by 6 in. preservative-treated wood or steel posts set 5 ft deep in compacted granular fill with ¾ inch exterior-type Grade B-B high-density concrete form overlay plywood.
    b. Half of sign (4 ft by 4 ft or equivalent area) shall consist of a graphic illustration of the project that will be provided in electronic form by the Architect. The graphic illustration shall be generated by General Contractor's applicator using an appropriate printing technology on media suitable for the installation condition.
    c. Owner, Contractor, Architect and Tenant logos and information will be on the other 4 ft by 4 ft area of the sign.
    d. Sign shall be maintained and refurbished to like-new condition at all times and at end of project.

2. Temporary Signs: Provide temporary signs as required by authorities having jurisdiction. Unauthorized signs are not permitted.

    a. Provide temporary directional signs in coordination with the Owner to inform public and individuals seeking entrance to the school entrances impacted by the Work.
    b. Provide temporary, directional signs for construction personnel and visitors to the construction site.

3. Maintain and touchup signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Comply with requirements specified in Section 015639 "Temporary Tree and Plant Protection."

F. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.

G. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

H. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

I. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

3.6 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION

SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.
2. Section 311000 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

A. Caliper: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at a height 6 inches above the ground for trees up to and including 4-inch size at this height and as measured at a height of 12 inches above the ground for trees larger than 4-inch size.

B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated .

D. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
b. Arborist's responsibilities.
c. Quality-control program.
d. Coordination of Work and equipment movement with the locations of protection zones.
e. Trenching by hand or with air spade within protection zones.
f. Field quality control.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
2. Detail fabrication and assembly of protection-zone fencing and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

C. Samples: For each type of the following:

1. Organic Mulch: 1-quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.

D. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

1. Species and size of tree.
2. Location on site plan. Include unique identifier for each.
3. Reason for pruning.
4. Description of pruning to be performed.
5. Description of maintenance following pruning.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For arborist and tree service firm.

B. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

C. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

D. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

E. Quality-control program.

1.7 QUALITY ASSURANCE

A. Arborist Qualifications: Qualified arborist as supported by licensing, certification or minimum 5 years or relevent education and experience. .

B. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Top soil l:Natural or cultivated top layer of the soil profile or manufactured topsoil; containing organic mater and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray or red than underlying subsoil; resonable free of sub soil, clay, lumps, gravel and other objects more than 1 inch in diameter; and free fo weeds, roots, and toxic and other non soil materials.

B. Protection-Zone Fencing: Fencing fixed in position and meeting[one of] the following requirements: Previously used materials may be used when approved by Architect.

1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches apart.

a. Height: 48 inches.
b. Color: High-visibility orange, nonfading.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prepare written report to the owner including all conditions, which in the opinion of the arborists, will detrimentally affect the performance of the plant and tree protection effort.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree to remain by tying a 1-inch blue vinyl tape around the trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Where poor topsoil, eroded or unsatisfactory conditions exist within tree-protection zones, place/apply 4 inches of shredded mulch. Maintain a 6 inch perimeter from tree trunk to mulch.

3.3 PROTECTION ZONES

A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.

B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 20 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

C. Maintain protection zones free of weeds and trash. Areas requiring mowing shall continue to be mowed according to Owner's pre-established mowing schedule.

D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.5 ROOT PRUNING

A. Prune tree roots that are affected by temporary and permanent construction. Prune roots following guidelines and Arborist's recommendations:

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Coat cut ends of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other coating formulated for use on damaged plant tissues and that is acceptable to arborist. Backfill as soon as possible.

B. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.

C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to tree root systems. Use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

D. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by the Architect.

1. Employ an arborist, licensed in the jurisdiction where the project is located, to submit details of proposed repairs and to repair damage to trees and shrubs
2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Architect.

3.6 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches in a manner consistent with these guidelines.

1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during contract period as recommended by Arborist.
2. Pruning operations shall follow the guidelines presented in ANSI A300 Part 1
3. Cut Branches with sharp pruning instruments; do not break or chop.
4. Do not apply pruning paint to wounds.

B. Chip removed branches and dispose of off-site.

3.7 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

E. Moderate Fill within Protection Zone: Where existing grade is more than 6 inches but less than 12 inches below elevation of finish grade, place drainage fill, filter fabric, and topsoil on existing grade within the drip line as follows:

1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18" from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6" below elevation of final grade.
2. Place filter fabric with edges overlapping 6 inches minim throughout drip-line.

3. Place fill layer topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations and install ground cover per Landscape Plan.

3.8 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

B. Promptly repair trees damaged by construction activities within 24 hours. Treat damaged trunks, limbs and roots according to an Arborist's written instructions.

C. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Large Trees: Provide new tree(s) of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
2. Provide two new tree(s) of same size and species as those being replaced for each tree that measures more than 6 inches in caliper size.

D. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch- diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augured soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION

SECTION 015723 - TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary stormwater pollution controls.

1.2 STORMWATER POLLUTION PREVENTION PLAN

A. The Stormwater Pollution Prevention Plan (SWPPP) is part of the Contract Documents and is bound into this Project Manual.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site unless otherwise directed.

1.4 INFORMATIONAL SUBMITTALS

A. Stormwater Pollution Prevention Plan (SWPP): Within 15 days of date established for commencement of the Work, submit completed SWPPP.

B. EPA authorization under the EPA's "2017 Construction General Permit (CGP)."

C. Stormwater Pollution Prevention (SWPP) Training Log: For each individual performing Work under the SWPPP.

D. Inspection reports.

1.5 QUALITY ASSURANCE

A. Stormwater Pollution Prevention Plan (SWPPP) Coordinator: Experienced individual or firm with a record of successful water pollution control management coordination of projects with similar requirements.

1. SWPPP Coordinator shall complete and finalize the SWPPP form.
2. SWPPP Coordinator shall be responsible for inspections and maintaining of all requirements of the SWPPP.

B. Installers: Trained as indicated in the SWPPP.

PART 2 - PRODUCTS

2.1 TEMPORARY STORMWATER POLLUTION CONTROLS

A. Provide temporary stormwater pollution controls as required by the SWPPP.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with all best management practices, general requirements, performance requirements, reporting requirements, and all other requirements included in the SWPPP.

B. Locate stormwater pollution controls in accordance with the SWPPP.

C. Conduct construction as required to comply with the SWPPP and that minimize possible contamination or pollution or other undesirable effects.

1. Inspect, repair, and maintain SWPPP controls during construction.

a. Inspect all SWPPP controls not less than every seven days, and after each occurrence of a storm event, as outlined in the SWPPP.

D. Remove SWPPP controls at completion of construction and restore and stabilize areas disturbed during construction.

END OF DOCUMENT 015723

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012300 "Alternates" for products selected under an alternate.
2. Section 012500 "Substitution Procedures" for requests for substitutions.
3. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved by Architect through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications. Submit a comparable product request, if applicable.

1.4 ACTION SUBMITTALS

A. Comparable Product Request Submittal: Submit request for consideration of each comparable product. Identify basis-of-design product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Architect's Approval of Submittal: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.
2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

    a. Name of product and manufacturer.
    b. Model and serial number.
    c. Capacity.
    d. Speed.
    e. Ratings.

3. See individual identification sections in Divisions 21, 22, 23, and 26 for additional identification requirements.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase: "Subject to compliance with requirements, provide the following: …"

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase: "Subject to compliance with requirements, provide products by the following: …"

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

    a. Limited list of products may be indicated by the phrase: "Subject to compliance with requirements, provide one of the following: …"

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, which complies with requirements.

    a. Non-limited list of products is indicated by the phrase: "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following: …"

5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.

a. Limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, provide products by one of the following: …"

6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, which complies with requirements.

a. Non-limited list of manufacturers is indicated by the phrase: "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following: …"

7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

B. Submittal Requirements: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 017300 - EXECUTION

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 general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering.
3. Installation of the Work.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.

1.3 QUALITY ASSURANCE

A. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:
1. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner’s property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within seven (7) days of date established for the No tice to Proceed.

1.4 INFORMATIONAL SUBMITTALS

A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:

1. Material category.
2. Generation point of waste.
3. Total quantity of waste in tons.
4. Quantity of waste salvaged, both estimated and actual in tons.
5. Quantity of waste recycled, both estimated and actual in tons.
6. Total quantity of waste recovered (salvaged plus recycled) in tons.
7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.

E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Achieve end-of-Project rates for salvage/recycling of 25 percent by weight of total nonhazardous solid waste generated by the Work. Facilitate recycling and salvage of materials.

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within seven (7) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Comply with requirements in Section 024119 "Selective Demolition for salvaging demolition waste.

B. Salvaged Items for Reuse in the Work:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

C. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

    a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING DEMOLITION WASTE

A. Asphalt Paving: Grind asphalt to maximum 2-inch (50-mm) size.

B. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.

C. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 2-inch (50-mm) size.

D. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum 2-inch (50-mm) size.
2. Clean and stack undamaged, whole masonry units on wood pallets.

E. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

F. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

G. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

H. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

I. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

J. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.

K. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

L. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

M. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

N. Conduit: Reduce conduit to straight lengths and store by material and size.

O. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

D. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

3.7 ATTACHMENTS

END OF DOCUMENT 017419

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect . Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals. Copy Architect

5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report.
5. Submit final completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. MS Excel electronic file. Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit by uploading to web-based project software site.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Sweep concrete floors broom clean in unoccupied spaces.
i. Remove labels that are not permanent.
j. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
l. Leave Project clean and ready for occupancy.

C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

2. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
3. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

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SECTION 017823 - OPERATION AND MAINTENANCE DATA

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 preparing operation and maintenance manuals, including the following:

1. Emergency manuals.
2. Systems and equipment operation manuals.
3. Systems and equipment maintenance manuals.
4. Product maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit [on digital media acceptable to Architect] [by uploading to web-based project software site] . Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.6 REQUIREMENTS FOR EMERGENCY, OPERATION MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.7 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.

2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.

10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.

2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017300 "Execution" for final property survey.
2. Section 017700 "Closeout Procedures" for general closeout procedures.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:
1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit PDF electronic files of scanned record prints
2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

b. Final Submittal:

1) Submit three paper-copy set(s) of marked-up record prints.
2) Submit PDF electronic files of scanned record prints and three set(s) of prints.

3) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit one paper copy annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy annotated PDF electronic files and directories of each submittal.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.

j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
5. Note related Change Orders**,** record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as annotated PDF electronic file paper copy

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders**,** record Specifications, and record Drawings where applicable.

C. Format: Submit record Product Data as annotated PDF electronic file paper copy

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file paper copy .

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

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SECTION 017900 - DEMONSTRATION AND TRAINING

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 instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Contractor.
e. Date of video recording.

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. For each program, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning.
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
1. Owner will furnish an instructor to describe Owner's operational philosophy.
2. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner, through Architect,or through Construction Manager, (if employed with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

1.9 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings on thumb drive.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

B. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments of approximately 15 minutes.

a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c.

C. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

D. Narration: Describe scenes on video recording by audio narration by microphone or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 012300 "Alternates" for products selected under an alternate.
2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit digital copy in PDF format for each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use facsimile of form approved by Architect.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

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

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Substitution request is fully documented and properly submitted.
c. Requested substitution will not adversely affect Contractor's construction schedule.
d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not permitted

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Demolition and removal of selected site elements.
   2. Salvage of existing items to be reused or recycled.

B. Related Requirements:
   1. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

   1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site unless otherwise directed.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Submit to Owner before Work begins.

1.6 WARRANTY

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Maintain adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly in an approved landfill or location.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and recycle or dispose of them in an approved landfill or approved location.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF DOCUMENT 024119

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PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Permanent Bollard
2. Removable Bollard
3. Bench ***(Not in contract, for information only)***
4. Bike Rack ***(Not in contract, for information only)***
5. Trash/Recycle Receptacle ***(Not in contract, for information only)***
6. Flagpole ***(Not in contract, for information only)***

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for installing anchor bolts cast, formed voids in concrete footings.
2. Section 312000 "Earth Moving" for excavation for installing concrete footings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

C. Samples for Initial Selection: For units with factory-applied finishes.

D. Product Schedule: For site furnishings.

E. Warranty: Manufacturer’s standard warranty, as applicable

F. Shop Drawings: Submit manufacturer’s shop drawings, including plans and elevations indicating overall dimensions.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For site furnishings manufactured with preservative-treated wood.

1. Indicate type of preservative used and net amount of preservative retained.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For site furnishings to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 PERMANENT BOLLARD

A. Basis of Design to be as manufactured by Reliance Foundry, 6450 148th St, Unit 207, Surrey, BC, Canada V3S 7G7; (877) 789-3245.
   1. Model: 'R-8460', embedded installation. Size: 35 1/2" height x 4 ½" Diameter width.
   2. Material: 316 stainless steel
   3. Finish: #6 satin finish
   4. Reflector strip color: White

2.2 FOLD-DOWN BOLLARD

A. Basis of Design to be as manufactured by Reliance Foundry, 6450 148th St, Unit 207, Surrey, BC, Canada V3S 7G7; (877) 789-3245.
   1. Model: 'R-8901', in a fold-down mounting installation
   2. Finish color to be Stainless Steel-brushed with yellow reflective strips
   3. Provide & install manufacturer's Fold Down Mounting System for this model

2.3 BENCHES ***(not in contract, for information only)***

A. Basis of Design to be as manufactured by Landscape Forms, Inc., 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax (269) 381-3455. Website www.landscapeforms.com E-mail: specify@landscapeforms.com
   1. Model: 'Neoliviano' Bench, backed with arms, sixty-nine (69) inch length.
   2. Cast Supports: A514 or A535 Aluminum
   3. Horizontal slats of Seat and Back Panel: Jarrah wood: solid stock, select Australian hardwood, for exterior use, no finish.
   4. Benches to be surface mounted w/ 304 stainless steel anchor tabs, set with stainless steel threaded rods.

2.4 BIKE RACK ***(not in contract, for information only)***

A. Basis of Design to be as manufactured by Landscape Forms, Inc., 7800 E. Michigan Ave, Kalamazoo, Michigan 49048. Phone: (800) 521-2546. Fax (269) 381-3455. Website www.landscapeforms.com E-mail: specify@landscapeforms.com
   1. Model: 'Loop' Bike Rack
   2. Frame: Aluminum Casting
   3. Finish: Metal: Landscape Forms, Inc. "Pangard II".

1. Primer: Rust inhibitor.
2. Topcoat: Thermosetting TGIC polyester powder coat. UV, chip, and flake resistant.
3. Test Results: “Pangard II”.
    a. Gloss Consistency, Gardner 60 Degrees, ASTM D 523: Plus or minus 5 percent from standard.
    b. UV Resistance, Color and Gloss, ASTM G 155, Cycle 7: Delta E less than 2 at 2.0 mils and less than 20 percent loss.
    c. Cross-Hatch Adhesion, ASTM D 3359, Method B: 100 percent pass.
    d. Flexibility Test, Mandrel, ASTM D 522: 3 mm at 2 mils.
    e. Erichsen Cupping, ISO 1520: 8 mm.
    f. Impression Hardness, Buchholz, ISO 2815: 95.
    g. Impact Test, ASTM D 2794: 60 inch-pounds at 2.5 mils.
    h. Pencil Hardness, ASTM D 3363: 2H minimum.
    i. Corrosion Resistance, 1,500-Hour Test, ASTM B 117: Max undercutting 1 mm.
    j. Humidity Resistance, 1,500-Hour Test, ASTM D 2247: Max blisters 1 mm.
    l. Color: Flambe Orange

3. Benches to be embedded using hardware pack as provided by manufacturer.

2.5 TRASH/RECYCLE RECEPTACLE

A. Basis of Design to be as manufactured by Victor Stanley, Inc. (800) 368-2573.
    1. Model: ‘RSDC-36’ from the Steelsites Series; combination trash and recycling receptacle.
    2. Components to be recycled solid steel bar
    3. Include two (2)- 18 gallon liners
    4. Include stainless steel keyed lock assembly.
    5. Provide standard decal package including top band and lid decals.
    6. Provide solid convex lid with no ashtray.
    7. Receptacle to be surface mounted using standard mounting plate, stainless steel anchor bolts to be provided by Contractor as required.
    8. Finish
        a. Color to be Grey.
        b. All fabricated metal components are steel shotblasted, etched, phosphatized, preheated, and electrostatically powder-coated with TGIC polyester powder coatings. Products are fully cleaned and pretreated, preheated and coated while hot to fill crevices and build coating film. Coated parts are fully cured to coating manufacturer’s specifications. The thickness of the resulting finish averages 8-10 mils (200-250 microns).

2.6 MATERIALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:

1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B211 (ASTM B211M).
2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B221 (ASTM B221M).
3. Structural Pipe and Tube: ASTM B429/B429M.
4. Sheet and Plate: ASTM B209 (ASTM B209M).
5. Castings: ASTM B26/B26M.

B. Steel and Iron: Free of surface blemishes and complying with the following:

1. Plates, Shapes, and Bars: ASTM A36/A36M.
2. Steel Pipe: Standard-weight steel pipe complying with ASTM A53/A53M, or electric-resistance-welded pipe complying with ASTM A135/A135M.

C. Stainless Steel: Free of surface blemishes and complying with the following:

1. Sheet, Strip, Plate, and Flat Bars: ASTM A666.
2. Pipe: Schedule 40 steel pipe complying with ASTM A312/A312M.
3. Tubing: ASTM A554.

D. Wood: Surfaced smooth on four sides with eased edges; kiln dried, free of knots, solid stock of species indicated.

E. Fiberglass: Multiple laminations of glass-fiber-reinforced polyester resin with UV-light stable, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat, and with manufacturer's standard finish.

F. Plastic: Color impregnated, color and UV-light stabilized, and mold resistant.

1. Polyethylene: Fabricated from virgin plastic HDPE resin.

G. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or noncorrodible materials; commercial quality, tamperproof, vandal and theft resistant, concealed, recessed, and capped or plugged.

H. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M; recommended in writing by manufacturer, for exterior applications.

I. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof

J. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:

1. Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil (0.0076 mm) thick.

2. Hot-Dip Galvanizing: According to ASTM A123/A123M, ASTM A153/A153M, or ASTM A924/A924M.

2.7 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended, so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.

E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

F. Factory Assembly: Factory assemble components to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

2.8 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.10 STEEL AND GALVANIZED-STEEL FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

2.11 IRON FINISHES

A. Powder-Coat Finish: Manufacturer's standard polyester powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

2.12 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run directional finishes with long dimension of each piece.
2. Directional Satin Finish: No 4.
3. Dull Satin Finish: No. 6.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch (19 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 129300

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SECTION 260500 - GENERAL PROVISIONS RELATED TO ELECTRICAL WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. The electrical work includes the furnishing of all labor, materials, accessories, and equipment required to install a complete and fully operational electrical system as shown, specified and/or reasonably implied for a complete project.

1.2 RELATED DOCUMENTS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. ANSI/NFPA 70.

1.3 COORDINATION

A. The Electrical Contractor shall coordinate his work with the other contractors in accordance with provisions of Division I.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with NECA Standard of Installation.

1.5 FEES, PERMITS, AND INSPECTIONS

A. Electrical Contractor shall obtain permits and arrange all inspections necessary for the installation of his work in accordance with General Conditions and furnish the Architect with certificates of inspection from all authorities having jurisdiction.

B. Inspections and tests shall be made upon formal written notice to the Architect from the Contractor sufficiently in advance to allow representatives of the Architect and Owner to be present for each test.

C. No construction shall be covered up or concealed until it has been inspected or approved. The Contractor shall furnish all material, labor, fuel, equipment and apparatus, and bear all expenses of such tests as are hereinafter specified for the work.

D. Final inspection and tests shall be made in the presence of the Architect and representatives of the Owner. The tests shall be made under conditions simulating as nearly as practicable those which will be obtained in operation and shall show conclusively that the requirements of the specifications have been fulfilled. Prior to receiving final payment, the Contractor shall, in accordance with Division 1, furnish to the Architect a certificate of inspection signed by the Electrical Inspector having jurisdiction.

1.6 REGULATORY REQUIREMENTS

A. Conform to the North Carolina State Building Code.

B. Conform to requirements of ANSI/NFPA 70.

C. Conform to requirements of ANSL'IEEE C2 where applicable.

D. Furnish products listed and classified by Underwriters Laboratories, Inc. or other North Carolina recognized third party testing agency.

1.7 QUALIFICATIONS

A. Manufacturer: Furnish products of manufactures listed or, where substitutions are allowed, furnish products of a company specializing in manufacturing products specified with minimum of three years' experience.

B. Installation: Equipment and systems installers shall have a minimum of 5 years' experience in installation of systems similar to those on this project unless indicated otherwise.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 1.

1.9 SEQUENCING AND SCHEDULING

A. Construct work in sequence under provisions of Division 1.

1.10 OPERATION AND MAINTENANCE MANUALS

A. Three (3) complete sets of operating and maintenance manuals shall be submitted to the Owner through the Architect/Engineer two (2) weeks prior to the pre-final inspection date.

B. The O&M manuals shall be installed in a 3-ring heavy back note book with the name of the building and the words "Operation and Maintenance Manuals" on the cover and spine. The manuals shall contain the following items as a minimum:

1. Index and page numbers.
2. Certificate of substantial completion.
3. All warranties.
4. List of all subcontractors and suppliers with names, addresses and phone numbers.
5. Certified testing and balancing report.
6. Complete start-up operation, and shut-down procedures for each system including sequence of events, locations of switches, emergency procedures and any other critical items.
7. Complete set of current shop drawings and equipment description showing all capacities and other operation conditions.
8. Equipment summary showing all capacities and ratings. (HP, Tons, KW, Filter size, etc.)
9. All submittal data and shop drawings.
10. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
11. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instruction.
12. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly; aligning and adjusting instructions.
13. Wiring and control diagrams.
14. Manufacturer's cuts, part numbers, and serial numbers.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIAL

A. Equipment and material of the same general type shall be of the same make throughout the work to provide uniform appearance, operation and maintenance.

B. Equipment and material shall be new and shall bear the manufacturer's name or trade name.

2.2 DIMENSIONS

The Contractor shall be responsible for ensuring that equipment provided fit the space available. He shall make necessary field measurements to ascertain space requirements, including those of connections, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

2.3 MANUFACTURER'S DIRECTIONS

A. The Contractor shall promptly notify the Architect in writing of any conflict between the requirements of the contract documents and manufacturer's directions and shall obtain the Architect's written instructions before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Architect, he shall bear all costs arising in correcting the deficiencies.

2.4 EQUIPMENT ACCESSORIES

A. The Contractor shall provide all equipment, accessories, connections, and incidental items necessary to fully complete the work, ready for use, occupancy and operation by the Owner.

PART 3 - EXECUTION

3.1 MATERIALS AND WORKMANSHIP

A. All materials and workmanship shall comply with all applicable codes, specifications, state and local ordinances, industry standards, and utility company regulations. At the completion of the work, fixtures, equipment and materials shall be cleaned and polished thoroughly and turned over to the Owner in a condition satisfactory to the Architect. Damage or defects developing before acceptance of the work shall be made good at the Contractor's expense.

3.2 LOCATION OF CONDUIT, FIXTURES, EQUIPMENT AND APPURTENANCES

A. These locations shall be adjusted to accommodate the work and equipment installed by other Contractors in mechanical equipment rooms and similar areas.

3.3 BUILDING AND FINISHES

A. Building and finishes shall be protected. The Contractor will be held responsible for damage incurred and shall repair all damage done.

3.4 SUPPORTS

A. The Contractor shall support plumb, rigid, and true to line all work and equipment installed under this contract. The Contractor shall thoroughly study project construction drawings, shop drawings, and catalog data to determine how equipment, accessories, fixtures, and related items are to be supported, mounted, or suspended. He shall provide all bolts, inserts, brackets, structural supports, and accessories for proper support whether or not shown on the drawings.

B. Sleeves, inserts and supports that may be required for the electrical work shall be furnished by the Electrical Contractor, and they shall be installed, except as otherwise specified, by the trade furnishing and installing the material in which they are to be located. Location of sleeves, inserts, and supports shall be directed by the Electrical Contractor who shall also insure that they are properly installed. Sleeves shall be neatly sawed, sheared, or cut with wheeled cutters. No flame cutting will be permitted.

C. Slots, chases, openings and recesses through floors, walls, ceilings, and roofs as specified will be provided by the various trades in their respective materials, but the Electrical Contractor shall see that they are properly located and shall do any cutting and patching caused by the neglect to do so.

D. Where sleeves are omitted or not provided in proper location through a concrete floor, the new holes at the proper location shall be drilled with a diamond core drill after obtaining permission from the Architect. No chiseling or other rough cutting will be permitted. No part of the building may be broken out, cut, burned out, or permanently removed.

3.5 COORDINATION

A. All power wiring and associated conduit shall be provided to Plumbing equipment by the Electrical Contractor. The Plumbing Contractor shall furnish all motor starters, disconnect switches, and combination starters for equipment furnished under their contract and turn them over to the Electrical Contractor for installation. All final power wiring connections to equipment shall be made by the Contractor furnishing the equipment from slack wire left by the Electrical Contractor.

3.6 PAINTING

A. All field painting of electrical work, with exception of touch-up paint on factory finished equipment, shall be by the Electrical Contractor in accordance with the 'Painting" section of these specifications. Any equipment which has its factory paint coat scratched or otherwise damaged shall be retouched with paint to match the finish coat by the Electrical Contractor, and shall be repainted if necessary. Cut ends of steel framing channel used for equipment support shall be painted with a compound providing equivalent protection to the factory provided finish.

3.7 TESTING

A. All test reports shall be typewritten and submitted in triplicate. Reports shall include: Item(s) tested, date of each test, name and signature of person(s) conducting test, and complete test results.

B. Provide testing on each product or system as hereinafter specified in individual sections, and/or as recommended by product manufacturer.

C. All test reports shall be submitted, reviewed, and approved prior to substantial completion.

3.8 CLEAN-UP

A. The Contractor shall clean equipment, fixtures, and wiring device covers with cleaning materials appropriate to the surface and material being cleaned. Bottoms of equipment enclosures shall be cleaned to remove metal filings and other debris. All debris and excess materials shall be removed from the work area. The Contractor shall remove from the site all debris, crating, temporary facilities, waste, tools, construction equipment, machinery, and surplus materials resulting from his work.

END OF SECTION 260500

SECTION 260519 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Building wire and cable.

B. Wiring connectors and connections.

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to

B. Division 1 - General Requirements.

C. Section 260532 - Conduit.

D. Section 260533 - Boxes.

E. Section 260553 - Identification.

1.3 REFERENCES

A. ANSIINFPA 70

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide for each wire and cable type.

C. Insulation Resistance Test Report.

D. Bolted Connections Torque Measurements.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record feeder sizes.

1.6 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.

B. Conductor sizes are based on copper, expressed in American Wire Gage (AWG) and Thousand Circular Mils (kcmil).

C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.

D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

1.7 COORDINATION

A. Determine required separation between cable and other work.

B. Determine routing to avoid interference with other work.

PART 2 - PRODUCTS

2.1 BUILDING WIRE AND CABLE

A. Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: ANSIINFPA 70, Type THHN/THWN.

2.2 CLASS 2 CONTROL CIRCUIT CONDUCTORS

A. Description: Solid or stranded, per system manufacturer's recommendations.

B. Conductor: Copper.

C. Insulation: Mm. 150 volt 60°C. PART 3-EXECUTION

2.3 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that mechanical work likely to damage wire and cable has been completed.

PART 3 - EXECUTION

3.1 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

C. Use stranded conductors for control circuits.

D. Use conductor not smaller than 12 AWG for power and lighting circuits.

E. Use conductor not smaller than 22 AWG for control circuits.

F. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.

G. Pull all conductors into raceway at same time.

H. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

I. Neatly train and lace wiring inside boxes, equipment, and panelboards.

J. Clean conductor surfaces before installing lugs and connectors.

K. Make splices, taps, and terminations to carry full capacity of conductors with no perceptible temperature rise.

L. Use split bolt connectors for copper conductor splices and taps, 8 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

M. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

N. All feeders shall be completely phased out as to sequence and rotation. Phase sequence shall be A-B-C from front to rear, top to bottom, or left to right when facing equipment.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Identify wire and cable under provisions of Section 260553.

B. Identify each conductor with its circuit number or other designation indicated on Drawings.

3.4 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Division 1.

B. Inspect wire for physical damage and proper connection.

C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values. Record torque measurements.

D. Verify continuity of each branch circuit conductor.

E. Perform insulation resistance test on wiring No. 6 AWG and larger using instrument which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms. Record test data and include in O&M Manuals.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Grounding electrodes and conductors.

B. Equipment grounding conductors.

C. Bonding.

1.2 REFERENCES

A. ANSIINFPA 70.

1.3 GROUNDING ELECTRODE SYSTEM

A. Metal underground water pipe.

B. Rod electrode.

C. Steel reinforcing of the building.

1.4 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.5 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide data for grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground.

D. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation and installation of exothermic connectors.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of grounding electrodes and ground rings.

PART 2 - PRODUCTS

2.1 ROD ELECTRODE

A. Manufacturers:

1. Carolina Galvanizing Corp.
2. Blackburn
3. Copperweld

B. Material: Copper-clad steel.

C. Diameter: 3/4 inch.

D. Length: 10 feet.

2.2 MECHANICAL CONNECTORS

A. Manufacturers:

1. Ilsco
2. O. Z. Gedney
3. Thomas & Betts

B. Material: Bronze.

2.3 WIRE

A. Material: Copper.

1. Wire #10 (AWG) and smaller shall be solid.
2. Wire #8 (AWG) and larger shall be stranded.

B. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

C. Insulation (Where applicable): Green THWN.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

A. Install Products in accordance with manufacturer's instructions.

B. Provide bonding to meet Regulatory Requirements.

C. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

3.3 EQUIPMENT AND CIRCUITS

A. Conduit Systems:

1. Ground all metallic conduit systems.
2. Conduit provided for mechanical protection and containing only a grounding conductor shall be bonded to that conductor at the entrance and exit from the conduit.

B. Boxes, Cabinets, Enclosures, and Panelboards:

1. Bond the grounding wires to each pullbox, junction box, outlet box, cabinets, and other enclosures through which the ground wires pass.
2. Provide lugs in each box and enclosure for ground wire termination.
3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs for terminating the ground wires.

C. Lighting Fixtures:

1. Fixtures shall be grounded.
2. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit.

D. Electrical Appliance and Equipment:

1. Fixed electrical appliances and equipment shall have a ground lug installed for termination of the green ground conductor.

3.4 CONDUCTIVE PIPING

A. Bond all conductive piping systems in the building to the building system ground.

3.5 FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Use suitable test instrument to measure resistance to ground of system. Perform and document testing in accordance with test instrument manufacturers recommendations using the fall- of-potential method. Submit report with close out documents.

END OF SECTION 260526

SECTION 260529 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.2 REFERENCES

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. ANSI/NFPA 70.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance. Steel materials used outside shall be galvanized or cadmium plated. Where materials are cut, welded, or scratched leaving an unprotected area, area shall be painted with cold galvanizing compound. If required, entire item shall be painted to avoid a "touched up" appearance.

B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.

C. Anchors and Fasteners:

1. Concrete Structural Elements: Use expansion anchors, powder actuated anchors, or preset inserts.
2. Steel Structural Elements: Use beam clamps, spring steel clamps, or steel ramset fasteners.
3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
4. Hollow Masonry and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
5. Sheet Metal: Use sheet metal screws. Do not fasten any materials to sheet metal which the metal does not have the strength to support.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation".

C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.

D. Obtain permission from Architect/Engineer before using powder-actuated anchors.

E. Do not drill or cut structural members.

F. Install surface-mounted cabinets and panelboards with minimum of four anchors.

END OF SECTION 260529

SECTION 260532 - CONDUIT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal conduit.

B. Flexible metal conduit.

C. Liquidtight flexible metal conduit.

D. Nonmetal conduit (PVC).

E. Fittings and conduit bodies.

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 260526 - Grounding and Bonding.

C. Section 260529- Supporting Devices.

D. Section 260533 - Boxes.

E. Section 260553 - Electrical Identification.

1.3 REFERENCES

A. ANSI C80.1

B. ANSI C80.3

C. ANSI C80.5

D. ANSI/NEMA FB 1

E. ANSI/NFPA 70

F. NECA "Standard of Installation."

G. NEMA RN 1

H. NEMA TC 2

I. NEMA TC 3

1.4 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.5 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide for each type conduit.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual routing of conduits larger than 2 inches.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Division 1.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

1.8 PROJECT CONDITIONS

A. Verify routing and termination locations of conduit prior to rough-in.

B. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

C. Conduit shall be concealed in all areas except mechanical rooms.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4 inch unless otherwise specified.

B. Underground Installations:

1. Use plastic coated metal conduit or Schedule 40 PVC conduit.

2. In or Under Slab on Grade: Use plastic coated metal conduit or Schedule 40 PVC conduit.

3. Use plastic coated threaded metal conduit (RMC or IMC) for all underground conduits between Class 1, Division 1 locations and the conduit seal located above grade. There shall be no union, coupling, box, or fitting between the point where the conduit emerges from below grade and the sealing fitting.

4. Underground conduit installed in duct bank shall be approved as “suitable for concrete encasement”.

C. Transition from Underground to Above Grade:

1. Where underground raceways are required to turn up into cabinets, distribution equipment, etc., or at poles, the elbow required and stub-up out of the earth or slab shall be galvanized RMC or IMC. Provide a bituminous coating on metal conduit in direct contact with the earth or concrete.

2. Exception to the above: Where conduit turns up into cabinets located above concrete slabs with bottoms 12 inches or less above slab, transition to metal conduit is not required.

D. In Slab above Grade:

1. Use Schedule 40 PVC conduit.

2. Maximum Size Conduit in Slab: 3/4-inch.

E. Exterior Locations:

1. Use RMC, IMC, Schedule 80 PVC, or PVC coated metal conduit.

F. Interior Dry Locations:

1. Concealed: Use RMC, IMC, or EMT.

2. Exposed above eight feet and not subject to physical damage: RMC, IMC, or EMT.

3. Exposed eight feet and below: Use RMC or IMC except that EMT may be used where branch circuits connect to the top of a surface mounted panelboard below eight feet.

G. Interior Damp or Wet Locations:

1. Use plastic coated metal conduit or Schedule 80 PVC conduit.

H. Exposed in pool areas:

1. Use plastic coated metal conduit or Schedule 80 PVC conduit.

I. Chemical Feed Rooms

1. Use Schedule 80 PVC conduit.

J. Conduit Containing Only Grounding Conductor(s):

1. Use Schedule 80 PVC conduit.

2.2 METAL CONDUIT

A. Manufacturers:

1. Allied Tube and Conduit.
2. LTV Corp.
3. Wheatland Tube Co.

B. Rigid Steel Conduit: ANSI C80.1.

C. Intermediate Metal Conduit (IMC): Rigid steel.

D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; threaded type material to match conduit. Split couplings are not acceptable.

1.2 PVC COATED METAL CONDUIT

A. Manufacturers:

1. Plasti-Bond
2. Perma-Cote
3. KorKap

B. Description: NEMA RN 1; galvanized rigid metal conduit with external PVC coating, 40 mil thick, and internal PVC coating, 2 mil thick. ETL-Verified.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coating to match conduit. Connectors; insulated throat type.

2.3 FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. Alflex Corp.
2. Carol Cable Co.
3. Alliance Cable Corp.

B. Description: Interlocked steel construction.

C. Fittings: ANSI/NEMA FB 1. Connectors; insulated throat type.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. Alflex Corp.
2. Carol Cable Co.
3. Alliance Cable Corp.

B. Description: Interlocked steel construction with PVC jacket.

C. Fittings: ANSI/NEMA FB 1. Connectors; insulated throat type.

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube and Conduit.
2. LTV Corp.
3. Wheatland Tube Co.

B. Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; die-cast set screw type. Connectors; die-cast insulated throat type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."

B. Provide suitable nylon pull string in each empty conduit except sleeves and nipples.

C. Use suitable plastic slip caps to protect installed conduit against entrance of dirt and moisture.

D. Ground and bond conduit under provisions of Section 260526.

E. Identify conduit under provisions of Section 260553.

F. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

G. Tubing shall not be used in concrete or underground.

H. Utilize liquid tight flexible metal conduit for connection to equipment.

I. Utilize flexible metal conduit for connection of light fixtures.

3.2 CONDUIT SUPPORTS

A. Arrange supports to prevent misalignment during wiring installation.

B. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

C. Do not attach conduit to ceiling support wires.

D. Conduit Supports:

1. Rigid Steel, IMC, and EMT: Conduit or tubing shall be fastened in place on not more than 6 feet on center for up through one inch and 8 feet on center for sizes larger than one inch and shall be fastened within 3 feet of connection to outlet boxes, junction boxes, cabinets, or fittings.

3.3 ROUTING

A. Route exposed conduit parallel and perpendicular to walls.

B. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

C. Maintain adequate clearance between conduit and piping.

D. Maintain 12 inch clearance between conduit and surfaces with temperatures exceeding 104 degrees F.

3.4 CONDUIT FITTINGS

A. Cut conduit square using saw or pipecutter; de-burr cut ends.

B. Bring conduit to shoulder of fittings; fasten securely.

C. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

D. Install no more than equivalent of four 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch size.

E. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints.

END OF SECTION 260532

SECTION 260533 - BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

C. Hand holes

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 262726 - Wiring Devices: Mounting heights of wiring device outlets.

C. Section 260529 – Supporting Devices.

1.3 REFERENCES

A. ANSI/NEMA FB 1

B. ANSI/NEMA OS 1

C. ANSI/NEMA OS 2

D. ANSI/NFPA 70

E. NEMA 250

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide for each type of box.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agencies. Include instructions for preparation and installation of product.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of all boxes and hand holes. Record mounting heights of outlet, pull, and junction boxes.

1.6 PROJECT CONDITIONS

A. Verify field measurements are as shown on Drawings.

B. Verify locations of floor boxes and outlets with other Contractors, Architect, and Owner's Representative prior to rough-in.

C. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: ANSI/NEMA OS 1, galvanized steel.

B. Minimum outlet box sizes:

1. Standard device box - 4" square x 1-1/2" deep.

2. Communication outlet boxes shall be 4-11/16” square x 2-1/8” deep

2.2 PULL AND JUNCTION BOXES

A. Surface-Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface-mounted junction box.

1. Material: Galvanized cast iron.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

B. Size: Minimum size as required by NFPA 70 or larger, as indicated.

2.3 PRECAST HANDHOLE STRUCTURES

A. Handholes shall be equal to Quazite PG2436BA30. Handholes are 24 inches by 36 inches by 30 inches deep. Provide heavy-duty 2-bolt cover with “Lighting” logo.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with the NFPA 70 and other regulatory requirements.

B. Install electrical boxes to present neat mechanical appearance.

C. Use adjustable steel channel fasteners for hung ceiling outlet box.

D. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.

E. Use gang box where more than one device is mounted together. Do not use sectional box.

F. Use gang box with plaster ring for single flush outlets.

G. Provide hand holes on all underground conduit runs that change direction.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Locate flush mounting box in masonry walls as they are erected and to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening. Finished plate shall cover the entire cut opening.

3.3 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with surface.

B. Install knockout closure in unused box opening.

C. The Architect shall have the right to make slight changes in the position of outlets if the contractor is notified prior to rough-in of outlet.

END OF SECTION 260533

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SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Wire color coding.

C. Device labels.

D. Placards

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 099100 - Painting.

1.3 REFERENCES

A. ANSI/NFPA 70.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Nameplates: Engraved three-layer laminated plastic, white letters on black background. Edges shall be chamfered. Minimum size shall be 1 inch high by 2.5 inches wide.

B. Locations: Major items of electrical equipment including switchboards, motor control centers, panelboards, individual starters, safety switches, transformers and individual components of switchboards and motor control centers shall be marked with a nameplate to identify the equipment.

C. Letter Size:

1. Use 1/4 inch letters for identifying individual loads.
2. Use 1/2 inch letters for identifying equipment and grouped loads.

2.2 WIRE MARKERS

A. Manufacturers

1. Seton Name Plate Co.
2. Thomas & Betts
3. 3M Electrical Products Div.

B. Description: Tape type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, junction boxes and each load connection. Provide markers on each side of bundled conductors within an enclosure.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams furnished with equipment.

2.3 PLACARDS

A. Placards: Engraved three-layered laminated plastic, white letter on black background.

2.4 LABELS

A. Labels: Clear adhesive plastic tape with black letters on clear background. Minimum size shall be 1/2 inch high.

B. Locations: Front top of all finished derive plates.

C. Letter Size:

1. Use 1/4 inch letters for identifying device circuit.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

A. Install nameplate parallel to equipment lines.

B. Secure nameplate to equipment front using screws or rivets.

C. Secure nameplate to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 6 inches below finished grade.

3.3 WIRE COLOR CODING

A. Color coding is required for all service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors. The color of the ungrounded and neutral conductors shall be as follows:

120/240 volt, single phase system

Phase A	Black
Phase B	Red
Neutral	White

B. Conductors #8 (AWG) and smaller shall be factory color coded.

C. Conductors #6 (AWG) and larger may be identified with plastic tape of the proper color.

3.4 BOX IDENTIFICATION

A. All cover plates of junction boxes for power wiring shall be legibly marked with permanent marker to clearly indicate panelboard origin and circuit number of all phase conductors enclosed.

B. All cover plates of junction boxes for fire alarm system wiring shall be painted red and shall be legibly marked with permanent marker to clearly indicate zone or signal circuit to which enclosed conductors are connected.

3.5 PAINTING

A. Painting for identification of products installed under the Electrical Contract shall be provided by the Electrical Contractor under provisions of Section 09900. Touch up painting required on factory finished equipment shall be by Contractor who furnishes the equipment.

3.6 CIRCUIT IDENTIFICATION

A. All receptacle cover plates shall be provided with a translucent plastic adhesive tape with ½" typed black letters identifying the circuit number that the receptacle is connected to.

B. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads. Hand written directories or corrections will not be accepted.

END OF SECTION 260553

SECTION 260919 - ENCLOSED CONTACTORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General purpose contactors.

B. Lighting contactors.

1.2 REFERENCES

A. ANSI/NEMA ICS 6.

B. NEMA ICS 2.

C. ANSI/NFPA 70.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Include dimensions, size, voltage ratings and current ratings.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of each contactor and indicate circuits controlled.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 1.

B. Maintenance Data: Include instructions for replacing and maintaining coil and contacts.

PART 2 - PRODUCTS

2.1 MANUFACTURERS - GENERAL PURPOSE CONTACTORS

A. Schneider Electric.

B. Siemens Energy & Automation.

C. Eaton.

D. General Electric.

2.2 GENERAL PURPOSE CONTACTORS

A. Description: NEMA ICS 2, AC general purpose magnetic contactor.

B. Coil Voltage: 120 Volts, 60 Hertz.

C. Poles: Number of poles as indicated on drawings.

D. Size: 20A unless otherwise indicated.

E. Enclosure: ANSI/NEMA ICS 6, Type 1.

F. Accessories:

2.3 SELECTOR SWITCH: ON/OFF/AUTOMATIC.

A. Indicating Light: RED.

B. Auxiliary Contacts: Two normally open and two normally closed.

2.4 LIGHTING CONTACTORS

A. Description: NEMA ICS 2, magnetic lighting contactor.

B. Configuration: Mechanically held, 2 wire control.

C. Coil Voltage: 120 Volts, 60 Hertz.

D. Poles: As indicated on drawings.

E. Contact Rating: 20A

F. Enclosure: ANSI/NEMA ICS 6, Type 1.

G. Accessories:

1. Selector Switch: ON/OFF/AUTOMATIC.
2. Indicating Light: RED.
3. Auxiliary Contacts: Two normally open and two normally closed.
4. Pushbuttons and Selector Switches: NEMA ICS 2, heavy duty, shrouded type.
5. Indicating Lights: NEMA ICS 2, push-to- test type, red.
6. Auxiliary Contacts: NEMA ICS 2, Class A300.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide label indicating type load controlled by contactor. Install labeling in accordance with Section 260553.

END OF SECTION 260919

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SECTION 262401 - UTILITY SERVICE ENTRANCE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Arrangement with Utility Company for permanent electric service.

B. Underground service entrance.

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 260532 - Conduit.

C. Section 260526 - Grounding and Bonding.

1.3 REFERENCES

A. ANSI/NFPA 70.

1.4 SYSTEM DESCRIPTION

A. Utility Company: Duke Energy

B. System Characteristics. 120/240 volt, 1-phase, 3-wire.

C. Electrical Contractor shall arrange for metering to be furnished by Utility Company.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with Utility Company requirements.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record locations of service entrance feeder and equipment to include utility company pad mounted transformer if applicable. Location dimensions shall be indicated from at least two above ground locations. Record distance of transformer from building.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

PART 2 - PRODUCTS

2.1 UTILITY METERS

A. Meter and base will be provided by Utility Company and mounted to the transformer enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that service equipment is ready to be connected and energized.

3.2 PREPARATION

A. Make arrangements with Utility Company to obtain permanent electric service to the Project.

B. Coordinate location of Utility Company's facilities to ensure proper access is available.

3.3 INSTALLATION

A. Install service entrance conduit for Utility Company's service lateral to service entrance equipment. Coordinate conduit stub ups below with pad by Contractor. Utility Company will make connections.

END OF SECTION 262401

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Distribution panelboards.

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 260529 - Supporting Devices.

C. Section 260553 - Electrical Identification: Engraved nameplates.

1.3 REFERENCES

A. NECA "Standard of Installation."

B. NEMA AB 1.

C. NEMA ICS 2.

D. NEMA PB 1.

E. NEMA PB 1.1.

F. NFPA 70.

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Record actual locations of Products; indicate actual branch circuit arrangement.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 1.

B. Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

1.8 MAINTENANCE MATERIALS

A. Provide maintenance materials under provisions of Division 1.

B. Provide two of each panelboard key.

PART 2 - PRODUCTS

2.1 PANELBOARD MANUFACTURERS

A. Schneider Electric.

B. Siemens Energy & Automation Corp.

C. Eaton Cutler Hammer.

D. General Electric Co.

2.2 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1, circuit breaker type.

B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard. Provide isolated ground bus when scheduled.

C. Minimum integrated short circuit rating: amperes rms symmetrical as indicated.

D. Enclosure: NEMA PB 1, Type 1.

E. Cabinet Front: Surface type, fastened with concealed trim hinge and latch. Provide hinged door with flush lock. Finish in manufacturer's standard gray enamel.

F. Molded Case Circuit Breakers: NEMA AB1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1.

B. Install panelboards plumb. Install flush panelboard flush with wall finishes. Provide supports in accordance with Section 260529.

C. Height: 6 ft to top of panelboard; install panelboards taller than 6 ft such that the center of the grip of the operating handle of the uppermost breaker, when in it's highest position, will not be more than 78 inches above the floor.

D. Provide filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

F. Provide engraved plastic nameplates under the provisions of Section 26 05 53.

G. Provide four spare conduits from the top of each recessed panelboard to an accessible location above the ceiling.

H. Provide an identified breaker handle tie at all locations where multi-wire branch circuits are connected to multiple single pole breakers. Install in compliance with NEC Article 210.

3.2 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION 262416

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SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Device plates and decorative box covers.

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to Division 1 - General Requirements.

B. Section 260533 - Boxes.

1.3 REFERENCES

A. NEMA WD 1

B. NEMA WD 6

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

C. Manufacturer's Instructions:

1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record locations of all wiring devices.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 1.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:

1. Hubbell.
2. Pass & Seymour.
3. Leviton.

B. Description: NEMA WD 1, heavy-duty AC only general-use snap switch.

C. Device Body: Ivory plastic toggle handle.

D. Voltage Rating: 120-277 volts, AC.

E. Current Rating: 20 amperes.

F. Single Pole: Hubbell #1221I or equal.

2.2 RECEPTACLES

A. Manufacturers:

1. Hubbell.
2. Pass & Seymour.
3. Leviton.

B. Description: NEMA WD 1; heavy-duty tamper resistant receptacle.

C. Device Body:

1. General-use receptacles not connected to generator: Ivory plastic

D. Configuration: NEMA WD 6; type as specified and indicated.

E. Convenience Receptacle: Tamper resistant, type 5-20.

F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.3 DEVICE PLATES

A. Decorative Cover Plate: Smooth brushed stainless steel unless otherwise noted.

1. Hubbell.
2. Pass & Seymour.
3. Leviton.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify outlet boxes are installed at proper height.

B. Verify wall openings are neatly cut and will be completely covered by wall plates.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install devices plumb and level.

C. Install switches with "OFF" position down.

D. Install receptacles with grounding pole on top.

E. Connect wiring device grounding terminal to outlet box with bonding jumper and to branch circuit equipment grounding conductor.

F. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

G. Jumbo size plates may be used only for outlets installed in masonry walls.

H. Install sheet steel plates only for outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes to obtain mounting heights specified and indicated on Drawings. Mounting heights indicated are to center of device.

3.5 FIELD QUALITY CONTROL

A. Inspect each wiring device for defects.

B. Operate each wall switch with circuit energized and verify proper operation.

C. Test each receptacle device for proper polarity.

D. Test each GFCI receptacle device for proper operation.

END OF SECTION 262726

SECTION 265100 - LUMINAIRES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. LED luminaires and accessories.

B. Drivers

1.2 RELATED SECTIONS

A. General provisions specifically applicable to Division 26 Sections, in addition to

B. Division 1 - General Requirements.

1.3 REFERENCES

A. ANSI C78.379.

B. ANSI C821.

C. ANSI C82.4.

D. ANSI/NFPA 70.

E. ANSI/NFPA 101.

F. NEMA WD6.

1.4 SUBSTITUTIONS

A. Submit under provisions of Section 012500.

B. Request for substitution shall indicate any and all deviation from fixture type listed in light fixture schedule on drawings.

1.5 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

C. Product Data: Provide dimensions, ratings, and performance data. Submit color brochure.

1.6 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 1.

B. Accurately record actual locations of each luminaire.

PART 2 - PRODUCTS

2.1 LED LUMINAIRES

A. Manufacturers

1. Approved Manufacturers: Provide products of firms regularly engaged in the manufacture of recessed lighting fixtures of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years. The manufacturer of the lighting fixtures shall comply with the provisions of the appropriate code and standards. All fixtures shall be pretested before shipping.
2. Conformance: Fixtures shall be manufactured in strict accordance with the Contract Drawings and Specifications.
3. Codes: Materials and installation shall be in accordance with the latest revision of the National Electrical Code and any applicable Federal, State, and local codes and regulations.
4. UL or CSA US Listing: All fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the “Standards for Safety" to UL 8750 or others as they may be applicable. A listing shall be provided for each fixture type, and the appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.
5. Specifications and scale drawings are intended to convey the salient features, function and character of the fixtures only, and do not undertake to illustrate or set forth every item or detail necessary for the work.

B. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.

C. Each luminaire shall be designed to operate at an average operating temperature of 25°C.

D. The operating temperature range shall be 0°C to +25°C.

E. Each luminaire shall meet all parameters of this specification throughout the minimum operational life when operated at the average operating temperature.

F. Luminaire housing to have no visible welding, screws, springs, hooks, rivets, bare LED's or plastic supports.

G. The luminaire shall be a single, self-contained device, not requiring on-site assembly for installation. The power supply and circuit board for the luminaire shall be integral to the unit.

H. LED Sources

1. Lumen Output – minimum initial lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-90 degree zone – as measured by IESNA Standard LM-79-08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
2. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours.
3. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
4. LED Boards shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED boards shall be upgradable.
5. Light Color

    a. Correlated Color temperature (CCT) range as per specification, between 3500K and 4100K shall be correlated to chromaticity as defined by the absolute (X,Y) coordinates on the 2- D CIE chromaticity chart.
    b. The color rendition index (CRI) shall be 80 or greater.
    c. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.

I. Photometric Requirements

1. Luminaire performance shall be tested as described herein.
2. Luminaire performance shall be judged against the specified minimum illuminance in the specified pattern for a particular application.
3. Luminaire lighting performance shall be adjusted (depreciated) for the minimum life expectancy (Section 2.2.5).
4. The performance shall be adjusted (depreciated) by using the LED manufacturer's data or the data from the IESNA Standard TM-21 test report, which ever one results in a higher level of lumen depreciation.
5. The luminaire may be determined to be compliant photometrically, if:

    a. The initial minimum illuminance level is achieved in 100% of the area of the specified lighting pattern
    b. The measurements shall be calibrated to standard photopic calibrations.

J. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.

2. The LED manufacturer's maximum junction temperature for the expected life shall not be exceeded at the average operating ambient.
3. The LED manufacturer's maximum junction temperature for the catastrophic failure shall not be exceeded at the maximum operating ambient.
4. The luminaire shall have an UL IC rating.

K. Optics

1. The optical assembly shall provide volumetric distribution to eliminate cave effect and provide uniform illumination in the space and increased luminance on vertical surfaces.
2. Optics shall consist of a ribbed metal reflector system and extruded refracting optical lens with high-transmission internal optical film applied to the inside of the refracting lens. No individual LED images shall be visible to the occupant of the space.
3. Refractor or lens shall be 2 piece assembly composed of impact-resistant (20%) DR acrylic with a polymer optical film.

2.2 WARRANTY

A. The manufacturer shall provide a warranty against loss of performance and defects in materials and workmanship for the Luminaires for a period of 5 years after acceptance of the Luminaires. Warranty shall cover all components comprising the luminaire. All warranty documentation shall be provided to customer prior to the first shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate and supports for luminaires.

B. Examine each recessed luminaire to determine suitability for ceiling construction type indicated. Provide mounting hardware recommended by manufacturer for applicable ceiling construction type.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Locate luminaires as indicated.

C. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prohibit movement.

D. Install accessories furnished with each luminaire.

E. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.3 FIELD QUALITY CONTROL

A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.4 ADJUSTING

A. Adjust Work under provisions of Division 1.

3.5 CLEANING

A. Clean Work under provisions of Division 1.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosure.

D. Clean photometric control surfaces as recommended by manufacturer.

E. Clean finishes and touch up damage.

END OF SECTION 265100

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SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf, and grasses and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks, pavements, and slabs.
6. Subbase course and base course for asphalt paving.
7. Subsurface drainage backfill for walls and trenches.
8. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

1.3 UNIT PRICES

A. Quantity allowances for earth moving are included in Section 012100 "Allowances."

B. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following. Unit prices for rock excavation include replacement with approved materials.

1. 24 inches outside of concrete forms other than at footings.
2. 12 inches outside of concrete forms at footings.
3. 6 inches outside of minimum required dimensions of concrete cast against grade.
4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
5. 6 inches beneath bottom of concrete slabs-on-grade.
6. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

1.4 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:

1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.

2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.

I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D1586.

J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

M. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preexcavation conference at Project site.

1. Review methods and procedures related to earthmoving, including, but not limited to, the following:

a. Personnel and equipment needed to make progress and avoid delays.
b. Coordination of Work with utility locator service.
c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
d. Extent of trenching by hand or with air spade.
e. Field quality control.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.
3. Geofoam.
4. Warning tapes.

B. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Warning Tape: 12 inches long; of each color.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.
2. Laboratory compaction curve according to ASTM D698.

C. Blasting plan approved by authorities having jurisdiction.

D. Seismic survey report from seismic survey agency.

E. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.8 QUALITY ASSURANCE

A. Blasting: Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:

1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
2. Seismographic monitoring during blasting operations.

B. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:

1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
2. Seismographic monitoring during blasting operations.

C. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1.9 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify "One Call" for area where Project is located before beginning earth-moving operations.

D. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.

E. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

F. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

G. Do not direct vehicle or equipment exhaust towards protection zones.

H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, or a combination of these groups; free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940/D2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C33/C33M; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: As follows:

a. Grab Tensile Strength: 157 lbf; ASTM D4632.

b. Sewn Seam Strength: 142 lbf; ASTM D4632.
c. Tear Strength: 56 lbf; ASTM D4533.
d. Puncture Strength: 56 lbf; ASTM D4833.

2. Apparent Opening Size: No. 70 sieve, maximum; ASTM D4751.
3. Permittivity: 0.5 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
1. Survivability: As follows:

a. Grab Tensile Strength: 247 lbf; ASTM D4632.
b. Sewn Seam Strength: 222 lbf; ASTM D4632.
c. Tear Strength: 90 lbf; ASTM D4533.
d. Puncture Strength: 90 lbf; ASTM D4833.

2. Apparent Opening Size: No. 60 sieve, maximum; ASTM D4751.
3. Permittivity: 0.02 per second, minimum; ASTM D4491.
4. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

2.3 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 ROCK EXCAVATION - BY BLASTING:

A. Permit - Where rock must be removed by blasting, a written permit must first be obtained from the Town of Wendell Public Works Department a minimum of 24 hours before any explosive materials or blasting agents are used within the corporate limits of the Town of Wendell and its extra-territorial jurisdiction (ETJ). A certificate of insurance must be submitted to the Town prior to any blasting operations regardless of the location of the blasting.

B. Hours of Blasting - Blasting for rock removal shall be conducted only Monday through Friday during normal business hours, 8 am to 4 pm.

C. Blasting Procedures - Blasting for trench rock may be initiated only after the permitting requirements prescribed in (1) above of this Section have been complied with. The Contractor is also reminded of the work hour limitations for blasting, as also established in (2) above of this Section.

Blasting Procedures shall conform to all applicable local, state, and federal laws and ordinances. The Contractor shall take all necessary precautions to protect life and property, including the use of an approved blasting mat where there exists the danger of throwing rock or overburden. The Contractor shall keep explosive materials which are needed on the job site in specially constructed boxes provided with locks. These boxes shall be painted red and plainly identified as to their contents. After working hours, the boxes containing explosive material shall be removed from the job site.

Failure to comply with this specification shall be grounds for suspension of blasting operations until full compliance is made. No blasting shall be allowed unless a galvanometer is employed to check cap circuits. Where blasting takes place within 500 feet of a utility, structure, or property which could be damaged by vibration, concussion, or falling rock, the Contractor shall be required to keep a blasting log containing the following information for each and every shot:

1. Date of shot
2. Time of shot
3. Foreman's name
4. Number and depth of holes
5. Approximate depth of overburden
6. Amount and type of explosive used in each hole
7. Type of caps used (instant or delay)
8. The weather

This blasting log shall be made available to the Owner upon request and shall be kept in an orderly manner. Compliance by the Contractor with these specifications does in no way relieve him of legal liabilities relative to blasting operations.

The Owner reserves the right to require removal of rock by means other than blasting where any utility, residence, structure, etc. is either too close to, or so situated with respect to the blasting hazardous.

3.4 EXCAVATION, GENERAL

A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Architect. The Contract Sum will be adjusted for rock excavation according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.

1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.

a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:

a. 24 inches outside of concrete forms other than at footings.
b. 12 inches outside of concrete forms at footings.
c. 6 inches outside of minimum required dimensions of concrete cast against grade.
d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
e. 6 inches beneath bottom of concrete slabs-on-grade.
f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Roadways: Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Backfill voids with satisfactory soil while removing shoring and bracing.

E. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

   a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

2. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.

F. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

G. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 95 percent of maximum dry unit weight according to ASTM D698 with a minimum of two passes of a plate-type vibratory compactor.

2. Place and compact impervious fill over drainage backfill in 6-inch-thick compacted layers to final subgrade.

3.18 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course and base course to required crown elevations and cross-slope grades.
4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698.

C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.19 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.20 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.
3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.21 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances were completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF DOCUMENT 312000

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction dewatering.

B. Related Requirements:

1. Section 013233 "Photographic Documentation" for recording preexisting conditions and dewatering system progress.
2. Section 015723 "Temporary Storm Water Pollution Control" for temporary storm water pollution controls mandated under the EPA's National Pollutant Discharge Elimination System.
3. Section 312000 "Earth Moving" for excavating, backfilling, site grading, and controlling surface-water runoff and ponding.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review condition of site to be dewatered, including coordination with temporary erosion-control measures and temporary controls and protections.
3. Review geotechnical report.
4. Review proposed site clearing and excavations.
5. Review existing utilities and subsurface conditions.
6. Review observation and monitoring of dewatering system.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.

1. Include plans, elevations, sections, and details.
2. Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.
3. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.

4. Include written plan for dewatering operations, including sequence of well and well-point placement coordinated with excavation shoring and bracings and control procedures to be adopted if dewatering problems arise.

B. Delegated Design Submittals: For dewatering system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Submittals:

1. Field quality-control reports.

B. Qualification Statements: For Installer.

C. Delegated design engineer qualifications.

D. Existing Conditions: Using photographs or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by dewatering operations. Submit before Work begins.

E. Record Drawings: Identify locations and depths of capped wells and well points and other abandoned-in-place dewatering equipment.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer: An experienced installer that has specialized in dewatering work.
2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in state where Project is located and who is experienced in providing engineering services of the type indicated.
3. Land Surveyor: A professional land surveyor who is legally qualified to practice in state where Project is located.

1.6 FIELD CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering in accordance with the performance requirements.
2. The geotechnical report is included elsewhere in Project Manual.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

1. Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

D. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 015000 "Temporary Facilities and Controls," Section 311000 "Site Clearing," during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
3. Maintain piezometric water level a minimum of 24 inches below bottom of excavation.

C. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

D. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

3.4 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks monthly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Architect if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

C. Prepare reports of observations.

3.5 PROTECTION

A. Protect and maintain dewatering system during dewatering operations.

B. Promptly repair damages to adjacent facilities caused by dewatering.

END OF DOCUMENT 312319

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SECTION 321216 - ASPHALT PAVING

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. Unless otherwise provided herein, all materials and street construction methods shall conform to the applicable requirements as outlined in the Standard Specifications for Roads & Structures, latest edition, as published by NCDOT. The following substitutions shall be read into the aforementioned specifications:

"State" or "Commission" shall be replaced by “City of Fayetteville”.

“Resident Engineer” shall be replaced by “City Representative” or their authorized representative.

“Sampling and Testing by Commission” shall be replaced by the words "sampling and testing by the Town or its duly authorized testing agent."

"Inspection by Commission" shall be replaced by "inspection by the City or its duly authorized representative."

All streets (private and public) shall be designed and constructed to the City and AASHTO Standards unless the NCDOT Standards are applicable. The NCDOT Standards shall be applicable on all existing state roads, extensions of existing state roads, or roads expected to be maintained by the state. Private streets may be permitted for non-residential and multi-family uses.

B. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt overlay.

C. Related Requirements:

1. Section 024119 "Selective Demolition" for demolition and removal of existing asphalt pavement.
2. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
3. Section 321313 "Concrete Paving" for concrete pavement and for separate concrete curbs, gutters, and driveway aprons.

4. Section 321373 "Concrete Paving Joint Sealants" for joint sealants and fillers at pavement terminations.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:

a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.4 ACTION SUBMITTALS

A. Product Data: Include technical data and tested physical and performance properties.

1. Herbicide.
2. Paving geotextile.
3. Joint sealant.

B. Hot-Mix Asphalt Designs:

1. Certification, by authorities having jurisdiction, of approval of each hot-mix asphalt design proposed for the Work.
2. For each hot-mix asphalt design proposed for the Work.

C. Samples for Verification: For the following product, in manufacturer's standard sizes unless otherwise indicated:

1. Paving Geotextile: 12 by 12 inches minimum.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For paving-mix manufacturer.

B. Material Certificates: Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1. Aggregates.
2. Asphalt binder.
3. Asphalt cement.
4. Cutback prime coat.
5. Emulsified asphalt prime coat.
6. Tack coat.
7. Fog seal.

8. Undersealing asphalt.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state in which Project is located.

B. Testing Agency Qualifications: Qualified in accordance with ASTM D3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of *Standard Specifications for Roads & Structures*, latest edition, as published by NCDOT for asphalt paving work.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D3910.
4. Asphalt Base Course and Binder Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Aggregate base course shall be placed and compacted in strict conformance with the standard requirements of NCDOT. Each layer shall be compacted to a density equal to at least 100 percent of that obtained by compacting a sample of the material or the nuclear target density as determined by AASHTO Method T-180 as modified by NCDOT. Collector and Arterial streets shall have a thickness of no less than 8 inches and shall conform to the standard requirements of NCDOT. The aggregate base course shall consist of crushed stone or crushed gravel. Before any material is used, approval shall be obtained as to the source of material and samples shall be furnished before placing any material.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320 binder designation PG 64-22.

B. Cutback Prime Coat: ASTM D2027/D2027M, medium-curing cutback asphalt, MC-30 or MC-70.

C. Emulsified Asphalt Prime Coat: AASHTO M 140 emulsified asphalt, or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

D. Tack Coat: AASHTO M 140 emulsified asphalt, or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

E. Fog Seal: AASHTO M 140 emulsified asphalt, or AASHTO M 208 cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

F. Water: Potable.

G. Undersealing Asphalt: ASTM D3141/D3141M; pumping consistency.

2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt pavement; reclaimed, unbound-aggregate base material; and recycled tires, asphalt shingles, or glass from sources and gradations that have performed satisfactorily in previous installations, equal to performance of required hot-mix asphalt paving produced from all new materials.

B. Herbicide: Commercial chemical for weed control, registered by the EPA, and not classified as "restricted use" for locations and conditions of application. Provide in granular, liquid, or wettable powder form.

C. Sand: AASHTO M 29, Grade No. 2 or No. 3.

2.4 MIXES

1. Surface Course Limit: Recycled content no more than 10 percent by weight.

B. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
2. Base Course: B25.0C.
3. Binder Course: II9.0C.
4. Surface Course: S9.5B.

C. Emulsified-Asphalt Slurry: AASHTO M 140.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 20 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.3 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch.

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.4 SURFACE PREPARATION

A. Ensure that prepared subgrade has been proof-rolled and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 INSTALLATION OF PAVING GEOTEXTILE

A. Apply tack coat uniformly to existing pavement surfaces at a rate of 0.20 to 0.60 gal./sq. yd.

B. Place paving geotextile promptly in accordance with manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches and transverse joints 6 inches.

C. Protect paving geotextile from traffic and other damage, and place hot-mix asphalt overlay the same day.

3.6 HOT-MIX ASPHALT PLACEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course and binder course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at a minimum temperature of 250 deg F.
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course and binder course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density, Marshall Test Method: 96 percent of reference laboratory density in accordance with ASTM D6927, but not less than 94 percent or greater than 100 percent.
2. Average Density, Rice Test Method: 92 percent of reference maximum theoretical density in accordance with ASTM D2041/D2041M, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.9 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:

1. Base Course and Binder Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course and Binder Course: 1/4 inch.
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined in accordance with ASTM D3549/D3549M.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with ASTM D979/D979M or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared in accordance with ASTM D2041/D2041M, and compacted in accordance with job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples in accordance with ASTM D1188 or ASTM D2726/D2726M.

a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
b. Field density of in-place compacted pavement may also be determined by nuclear method in accordance with ASTM D2950/D2950M and coordinated with ASTM D1188 or ASTM D2726/D2726M.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.11 WASTE HANDLING

A. General: Handle asphalt-paving waste in accordance with approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF DOCUMENT 321216

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SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes Concrete Paving

1. Driveways.
2. Roadways.
3. Parking lots.
4. Curbs and gutters.
5. Walks.

B. Related Requirements:
1. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.
2. Section 321723 "Pavement Markings."

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, 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.
    e. Manufacturer's representative of stamped concrete paving system used for stamped detectable warnings.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of product or exposed finish, prepared as Samples of size indicated below:

1. Exposed Aggregate: 10-lb Sample of each mix.

C. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

D. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Stamped Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.

B. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

C. Testing Agency Qualifications: Qualified according to ASTM C1077 and ASTM E329 for testing indicated.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.9 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

C. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A, plain steel.

D. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed.

E. Galvanized Reinforcing Bars: ASTM A767/A767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A615/A615M, Grade 60 deformed bars.

F. Epoxy-Coated Reinforcing Bars: ASTM A775/A775M or ASTM A934/A934M; with ASTM A615/A615M, Grade 60 deformed bars.

G. Steel Bar Mats: ASTM A184/A184M; with ASTM A615/A615M, Grade 60 deformed bars; assembled with clips.

H. Plain-Steel Wire: ASTM A1064/A1064M, galvanized.

I. Deformed-Steel Wire: ASTM A1064/A1064M.

J. Epoxy-Coated-Steel Wire: ASTM A884/A884M, Class A; coated, deformed.

K. Joint Dowel Bars: ASTM A615/A615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A767/A767M, Class I coating. Cut bars true to length with ends square and free of burrs.

L. Epoxy-Coated, Joint Dowel Bars: ASTM A775/A775M; with ASTM A615/A615M, Grade 60 plain-steel bars.

M. Tie Bars: ASTM A615/A615M, Grade 60; deformed.

N. Hook Bolts: ASTM A307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

O. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

P. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

Q. Zinc Repair Material: ASTM A780/A780M.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
1. Cement used shall be a standard brand of Portland Cement or high-early strength Portland Cement conforming to the requirements of AASHTO Specification M-85.

B. Normal-Weight Aggregates: Use standard size No. 57, No. 57M, No. 67 or No. 78M coarse aggregate in concrete 29 for Portland cement concrete pavement unless otherwise specified by the Engineer, from a single source.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Water: Potable and complying with ASTM C94/C94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber ASTM D1752, cork or self-expanding cork or ASTM D8139, semirigid, closed-cell polypropylene foam in preformed strips.

B. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.

C. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy-Bonding Adhesive: ASTM C881/C881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

E. Chemical Surface Retarder: Water-soluble, liquid, set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

F. Pigmented Mineral Dry-Shake Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
   1. Color: As selected by Architect from manufacturer's full range.

G. Rock Salt: Sodium chloride crystals, kiln dried, coarse gradation with 100 percent passing 3/8-inch sieve and 85 percent retained on a No. 8 sieve.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

   1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
   2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Cementitious Materials: Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

   1. Air Content, 1-1/2-inch Nominal Maximum Aggregate Size: 4-1/2 percent plus or minus 1-1/2 percent.
   2. Air Content, 1-inchNominal Maximum Aggregate Size: 4-1/2 percent plus or minus 1-1/2 percent.
   3. Air Content, 3/4-inchNominal Maximum Aggregate Size: 5 percent plus or minus 1-1/2 percent.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

E. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.5 lb/cu. yd..

F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

G. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): 3000 psi.
2. Slump Limit: 7 inches, plus or minus 1 inch.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 INSTALLATION OF STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

F. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D3963/D3963M.

G. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.
3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

I. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

J. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.

1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.
2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

3.8 INSTALLATION OF DETECTABLE WARNINGS

A. Blockouts: Form blockouts in concrete for installation of detectable paving units specified in Section 321726 "Tactile Warning Surfacing."

1. Tolerance for Opening Size: Plus 1/4 inch, no minus.

B. Cast-in-Place Detectable Warning Tiles: Form blockouts in concrete for installation of tiles specified in Section 321726 "Tactile Warning Surfacing." Screed surface of concrete where tiles are to be installed to elevation, so that edges of installed tiles will be flush with surrounding concrete paving. Embed tiles in fresh concrete to comply with Section 321726 "Tactile Warning Surfacing" immediately after screeding concrete surface.

3.9 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing moisture-retaining-cover curing or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3.10 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 1/4 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet-long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.

9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 5000 sq. ft. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.12 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF DOCUMENT 321313

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SECTION 321316 - DECORATIVE CONCRETE PAVING

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. Exposed Aggregate Finish concrete paving

B. Stencil Sandblasting inscriptions in exposed aggregate finish concrete paving

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Approved by manufacturer of decorative concrete paving systems.

B. Mockups to demonstrate surface finish, texture, and color; curing; and standard of workmanship. Contractor to prepare a minimum of two concrete test panels illustrating each finish type within this Section. Test panels shall be a minimum of eighteen inches in length and width. Test panels shall be prepared for each specified finish. For the Stencil sandblasting, Contractor to use a test stencil with the same characteristics of the main stencils. Contractor to modify abrasive materials, gradation or application methods in order to achieve the specified finish. Contractor to provide up to three levels of blast finish for stencilling to illustrate the range of finish per blast: light blast finish (maximum 1/8-inch reveal), medium blast finish (3/16 inch to 1/4 inch reveal) and hart blast finish which is a reveal greater than 1/4 inch. Architect to make final selection based on review of mockups.

C. Shop Drawings: Contractor to provide shop drawings showing location, layout, dimensions, finish, font and text height of each occurrence of words to be inscribed per Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete, General: ACI 301 (ACI 301M).

B. Reinforcement:

1. Steel welded wire.

    a. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.

2. Joint dowel bars.

    a. Joint dowel bars shall consist of a 3/8 inch by 4 ½ inch square smooth steel plate cut from hot-rolled plate steel conforming to the requirements of ASTM A36 and compatible pocket former sleeve.

3. Synthetic Fiber: Monofilament

C. Concrete:

1. Portland Cement Replacement: Use fly ash, slag cement, and silica fume to reduce portland cement by 40 percent.
2. Portland Cement: ASTM C 150, gray.
3. Fly ash.
4. Slag cement.
5. Blended cement.
6. Normal-weight aggregate.
7. Air-entraining admixture.
8. Color pigment.
9. Compressive Strength: 4000 psi (27.6 MPa) at 28 days.

D. Integral Color Admixture:

E. 'Chromix' P Admixture by Sika Scofield Corporation, 4155 Scofield Rd, Douglasville, GA 30134. (800)-800-9900.

1. Contractor to submit samples showing a range of colors in the medium to dark cool grey to charcoal color range.

F. Aggregate for Exposed Aggregate Concrete:

1. Stone shall be water washed peastone matching the approved colored samples, with rounded edges, free from organic materials, surface coatings, or other deleterious materials. It shall conform to the following gradations:

Sieve Size	Percent Passing (by Weight)
3/8 inch	100
No. 4	20-50
No. 8	0-15

Stone shall be of multiple colors in a range of light grays, dark grays and blacks. Stone colors shall be approved by the Landscape Architect from submitted samples.

G. Curing and Sealing Materials:

1. Curing shall be by moist curing or by use of curing compound.

2. Curing paper shall be nonstaining, fiber reinforced laminated kraft bituminous product conforming to ASTM C 171. Four mil polyethylene sheeting may be substituted for curing paper.
3. Curing compound shall be a resin-base, white pigmented compound conforming to ASTM C 309, Type 2.

H. Stencil

1. Stencil material, thickness, size, durability and adhesive quality shall be as recommended by the stencil manufacturer to achieve the specified finish. Graphics shown on plans will be made available to the Contractor for the template manufacturer's use. Multiple layers of stencils may be required to achieve the graphics and finish shown on plans.

I. Abrasive Materials

1. Materials to be used in the sandblasting process shall be selected based on results of the blast finishes applied on the test panels and approved by the Architect.
2. Typical abrasives used are coal slag for Light Blast Finish and garnet, steel shot or aluminum oxide for a Medium or Hard Blast Finish.
3. Silica sand and other types of nonmetallic abrasives containing more than one percent free silica, will not be allowed.

2.2 FIELD QUALITY CONTROL

A. Testing: By Contractor-engaged agency.

3.1 EXECUTION

A. FINISHING

1. All operation of delivery, placement, screeding, striking off and bull floating concrete pavement shall be as previously specified for plain concrete pavement in Section 321313 – CONCRETE PAVING.
2. When workmen can walk on top of concrete, they will then use a fine mist spray to remove top layer of paste, thereby exposing the smooth aggregate surface.
3. One hour after first spray, repeat procedure B above.
4. Five to ten days after concrete is poured, return to site to mildly acid wash exposed aggregate surface to remove any additional sand and cement slurry left on top of stone.

5. Stenciling of pavement to occur after concrete pavement has received exposed aggregate finish treatment. Stencils to be secured in place and approved by the Architect prior to final sand-blasting operation.

3.2 ACCEPTANCE STANDARDS

A. The following acceptance standards shall be applied to this Contract. These standards are considered superior to typical industry standards. Any portion of the concrete paving that does not come up to these required acceptance standards shall be removed at the direction of the Landscape Architect. Saw cut pavement at nearest adjacent tooled joint, remove concrete pavement and discard off site in a legal manner and replace with new concrete pavement meeting the requirements of this Division 2 Section, CONCRETE PAVEMENT.

Pavement surfaces shall be free of all cracking.
Pavement surfaces shall not pond water.
Pavement surfaces shall be free of visible high and low spots.
Steel mesh reinforcing shall not penetrate the surfaces or sides of the concrete slab.
Tooled joints and all expansion joints shall be straight, true, uniform in width and free from twists, bends, kinks and misalignments.
Saw cut joints shall be free of chips and spauling at joint edges.
Tooled edges and the associated edging patterns shall be consistent, true, crisp and complete.
Broom finish shall not be too coarse in the opinion of the Landscape Architect.
Broom finish shall be constant and complete between joints without bare spots, lifts or disconnections in broom pattern.
Pavement shall show no graffiti. Pavement shall show no rubbed surfaces indicative of attempts to erase graffiti.
Expansion joints and score joints shall be placed as required by the Contract Documents.
Concrete surfaces shall be free of all stains, including those created during the course of the construction by the Contractor, caused by natural events, or caused by vandalism.
All tooled joints and expansion joints shall be flush.
Stains from construction or from natural causes
Pours different in color as determined by the Landscape Architect.
Pours without expansion joints cast into them.
Pours not conforming to the Contract Documents.
All forms and stencils shall be removed from the site.
Words inscribed by stencil sandblasting finish shall have uniform overall appearance when the surface is viewed in total.

END OF SECTION 321316

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Cold-applied, fuel-resistant joint sealants.
4. Hot-applied, fuel-resistant joint sealants.
5. Joint-sealant backer materials.
6. Primers.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Concrete pavement joint sealants.
2. Joint-sealant backer materials.

B. Paving-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For Installer.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Entity that employs installers and supervisors who are trained and approved by manufacturer.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Testing: Performed by a qualified testing agency.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backer materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D5893/D5893M, Type NS.

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D5893/D5893M, Type SL.

C. Multicomponent, Nonsag, Urethane, Elastomeric Joint Sealant: ASTM C920, Type M, Grade NS, Class 25, for Use T.

D. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920, Type S, Grade P, Class 25, for Use T.

E. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920, Type M, Grade P, Class 25, for Use T.

2.3 HOT-APPLIED JOINT SEALANTS

A. Hot-Applied, Single-Component Joint Sealant, Type I, II, or III: ASTM D6690.

2.4 COLD-APPLIED, FUEL-RESISTANT JOINT SEALANTS

A. Fuel-Resistant, Single-Component, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C920, Type S, Grade P, Class 25, for Use T.

B. Fuel-Resistant, Multicomponent, Pourable, Modified-Urethane, Elastomeric Joint Sealant: ASTM C920, Type M, Grade P, Class 12-1/2 or 25, for Use T.

2.5 HOT-APPLIED, FUEL-RESISTANT JOINT SEALANTS

A. Hot-Applied, Fuel-Resistant, Single-Component Joint Sealants, Type I or Type II: ASTM D7116.

B. Hot-Applied, Fuel-Resistant, Single-Component Joint Sealants, Type III: ASTM D7116.

2.6 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.7 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backers to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backer materials.
2. Do not stretch, twist, puncture, or tear joint-sealant backer materials.
3. Remove absorbent joint-sealant backer materials that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backer material installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants in accordance with the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

3.5 PAVING-JOINT-SEALANT SCHEDULE

A. Joints within concrete paving:

1. Joint Location:

a. Expansion and isolation joints in concrete paving.
b. Contraction joints in concrete paving.
c. Other joints as indicated.

2. Joint Sealant: Single-component, self-leveling, silicone joint sealant.

B. Joints within concrete paving and between concrete and asphalt paving:

1. Joint Location:

a. Joints between concrete and asphalt paving.
b. Joints between concrete curbs and asphalt paving.

c. Other joints as indicated.

2. Joint Sealant: Hot-applied, single-component joint sealant.

C. Fuel-resistant joints within concrete paving:

1. Joint Location:

a. Expansion and isolation joints in concrete paving.
b. Contraction joints in concrete paving.
c. Other joints as indicated.

2. Joint Sealant: Fuel-resistant, single-component, pourable, modified-urethane, elastomeric joint sealant.

END OF DOCUMENT 321373

SECTION 321713 - PARKING BUMPERS

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

B. Section includes concrete wheel stops.

1.3 ACTION SUBMITTALS

C. Product Data: For each type of product.

A. Samples for Initial Selection: For each type of exposed finish requiring color selection.

B. Samples for Verification: For wheel stops, 6 inches (150 mm) long showing color and cross section; with fasteners.

PRODUCTS

2.1 PARKING BUMPERS

A. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi (27.6-MPa) minimum compressive strength, 4-1/2 inches high by 6 inches by 48 inches long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.
   1. Surface Appearance: Free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.
   2. Surface Sealer: Manufacturer's standard salt-resistant, clear sealer applied at precasting location.
   3. Mounting Hardware: Galvanized-steel dowel, 1/2-inch (13-mm) diameter, 10-inch (254-mm) minimum length.

EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

C. Install wheel stops according to manufacturer's written instructions unless otherwise indicated.

A. Install wheel stops in bed of adhesive before anchoring.

B. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 321713

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.
2. Painted markings applied to concrete surfaces.

1.3 PREINSTALLATION MEETINGS

1. Review methods and procedures related to marking asphalt paving or concrete surfaces including, but not limited to, the following:

    a. Asphalt-paving or concrete-surface aging period before application of pavement markings.
    b. Review requirements for protecting pavement markings, including restriction of traffic during installation period.

1.4 ACTION SUBMITTALS

A. Product Data: Include technical data and tested physical and performance properties.

1. Pavement-marking paint, alkyd.
2. Pavement-marking paint, solvent-borne.
3. Pavement-marking paint, acrylic.

B. Shop Drawings:

1. Indicate pavement markings, colors, lane separations, defined parking spaces, and dimensions to adjacent work.
2. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NCDOT for pavement-marking work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain pavement-marking paints from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" the ABA standards of the Federal agency having jurisdiction.

2.3 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint, Alkyd: As per Section 1087 – Pavement Markings of the NCDOT 2018 Standard Specifications for Roads and Structures.

1. Color: As indicated.

B. Pavement-Marking Paint, Solvent-Borne: MPI #32, solvent-borne traffic-marking paint.

1. Color: As indicated.

C. Pavement-Marking Paint, Acrylic: Acrylic, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952F, Type II, with drying time of less than 45 minutes.

1. Color: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement-marking substrate is dry and in suitable condition to begin pavement marking in accordance with manufacturer's written instructions.

B. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow asphalt paving or concrete surfaces to age for a minimum of 90 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to asphalt paving or concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
2. Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

3.3 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF DOCUMENT 321723

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SECTION 321726 – TACTILE WARNING SURFACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Surface-applied detectable warning tiles.

B. Related Requirements:

1. Section 321313 "Concrete Paving" for concrete walkways serving as substrates for tactile warning surfacing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Submit shop drawings for each location to receive a tactile warning surface including all curb ramps, flush crossings, crosswalks, etc. Illustrate the layout at each location.

1.4 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.

PART 2 - PRODUCTS

2.1 TACTILE WARNING SURFACING, GENERAL

A. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities for tactile warning surfaces.

1. For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.

B. Source Limitations: Obtain each type of tactile warning surfacing from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

2.2 DETECTABLE WARNING TILES

A. Cast-in-Place Detectable Warning Metal Tiles: Accessible truncated-dome detectable warning metal tiles configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Basis of Design: Neenah Enterprises, LTD; 4984-24Q.
   b. Advantage Tactile Systems.
   c. EJ.

2. Dome Spacing and Configuration: Manufacturer's standard ADA compliant spacing pattern.
3. Provide radial tiles to match adjacent radii when located along a curve, refer to Contract Drawings
4. Mounting: Permanently embedded detectable warning tile wet-set into freshly poured concrete.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:

1. Furnish Type 304 stainless-steel fasteners for exterior use.
2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

B. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF TACTILE WARNING SURFACING

A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

3.3 INSTALLATION OF DETECTABLE WARNING TILES

A. Cast-in-Place Detectable Warning Tiles:

1. Concrete Paving Installation: Comply with installation requirements in Section 321313 "Concrete Paving." Mix, place, and finish concrete to conditions complying with detectable warning tile manufacturer's written requirements for satisfactory embedment of tile.
2. Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedments in wet concrete by tamping or vibrating. If necessary, temporarily apply weight to tiles to ensure full contact with concrete.
3. Set surface of tile flush with surrounding concrete and adjacent tiles, with variations between tiles and between concrete and tiles not exceeding plus or minus 1/8 inch (3 mm) from flush.
4. Protect exposed surfaces of installed tiles from contact with wet concrete. Complete finishing of concrete paving surrounding tiles. Remove concrete from tile surfaces.
5. Clean tiles using methods recommended in writing by manufacturer.

3.4 CLEANING AND PROTECTION

A. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.

B. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 321726

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The General Documents, as listed on the Table of Contents, and applicable parts of Division 1, GENERAL REQUIREMENTS, shall be included in and made a part of this Section.

B. Examine all Contract Documents and all other Sections of the Specifications for requirements therein affecting the work of this trade.

1.02 SUMMARY

A. This Section includes providing irrigation design work and furnish all labor, materials, services, equipment and appliances required to complete the work of designing and installing an automatic irrigation system and related items, as specified herein, including, but not limited to, the following:
   1. Irrigation, completely installed.
   2. All necessary piping, valves, pipe sleeves, sprinkler heads, pipe sleeve, meter pit, controller, control box, wiring, pipe drains, backflow preventer, soil moisture sensor and all appurtenances.
   3. Connection to water system.
   4. Connection to electrical system.
   6. All necessary earthwork products, including loam, gravel, crushed stone, sand, and all appurtenances associated with construction of and installation of the irrigation system.
   7. Concrete for piping thrust block support and components base foundations.

B. The design and installation of the irrigation system shall be based upon the following irrigation performance standards:
   1. The irrigation system shall be designed to provide a minimum of one inch of water per week to all planting bed areas.
   2. System shall be designed so that all water can be applied during a 6-hour period of time between 3:00 am, and 9:00 am.
   3. There shall be head-to-head coverage between all irrigation sprinkler heads.
   4. Under no circumstances shall the placement of irrigation sprinkler heads allow for the irrigation of pavement areas.
   5. Irrigation spray and rotary heads shall operate within the parameters of existing water pressures.
   6. Contractor shall coordinate as the final location of irrigation equipment within the site. The controller shall be placed in an above ground box at a location to be approved by the Architect. The above ground box shall also house soil moisture sensor and booster pump if required.
   8. Available water: Primary source of water to be from domestic water service. Design the system to prevent any contamination of domestic water service.
   9. Piping shall be sized so that velocity of water within control room, PVC and metal irrigation piping shall not exceed 5 feet per second. Main line piping,

between the source and the control valves, shall not exceed 4 feet per second within PVC pipe, and 4 feet per second within polyethylene pipe.

10. Automatic and manual valves shall be sized so that velocity of water within units shall not exceed 5 feet per second.
10. One zone valve shall be used for each clock station.
11. All irrigation piping shall be of suitable material to be permanently installed below grade at depths specified and indicated on the detail drawings.

C. Areas to be irrigated shall include.
   1. All landscape shrub, grass, plug and tree plantings within the limits of irrigation diagram as indicated in the Drawings.

D. This specification is intended as an outline to irrigation requirements. The Contractor shall submit a complete design and working plan, outlining all irrigation requirements, for review and acceptance by the Architect. The Contractor shall be required to furnish and install all materials necessary to complete the irrigation systems in accordance with the best practice and to the full intent of the Contract Documents and the material requirements described in this Section.

E. Should there appear to be a question of intent, the Contractor shall refer the matter to the Architect for decisions, and their interpretation shall be final, conclusive and binding.

F. Trench excavation, backfilling and bedding materials, together with the testing of the completed installation shall be included in this work.

G. The work shall be constructed and finished in every respect in a good, workmanlike and substantial manner, to the full intent and meaning of the Drawings and Specifications. All parts necessary for the proper and complete execution of the work, whether the same may have been specifically mentioned or not, or indicated on the Drawings, shall be done or furnished in a manner corresponding with the rest of the work as if the same were specifically herein described.

1.03 REFERENCES AND DEFINITIONS

A. The following related items are included herein and shall mean:
   1. Standard Specifications: The North Carolina Department of Transportation standard specifications, latest edition.
   2. ASTM: American Society for Testing and Materials.
   3. AASHTO: American Association of State Highway and Transportation Officials.
   4. ANSI: American National Standards Institute.
   5. AWWA: American Water Works Association.
   6. ASME: American Society of Mechanical Engineers.
   7. ISO: International Organization for Standardization..
   8. OSHA: Occupational Safety And Health Administration.
   9. CDA: Copper Development Association. All references to the CDA are referenced standards published within the “copper tube handbook” Published by the Copper Development Association latest edition.

B. Pipe sizes used in this Section are nominal pipe size (NPS) in inches. Tube sizes are Standard size in inches.

C. Supply Piping: Piping from water source connection to irrigation system pressure piping. Piping is under same pressure as water supply. Piping in this category is included in this Section from water source connection to 5 feet outside foundation wall.

D. Pressure Piping: (Main Line Piping) Piping downstream from supply piping to and including control valves. Piping is under irrigation system pressure during operation, and under static pressure when system is not in operation. Piping in this category includes pipe and master valves.

E. Zone, Circuit and Distribution: (Zone, Circuit or Distribution Piping:) Piping downstream from control valves to irrigation system sprinklers. This piping is not under static pressure when the system is not operating. Piping is under pressure (less than operational piping) when the system is turned on and the sprinkler heads are in operation.

F. Controller: A controller is in mechanical or electronic device, which instructs the electric station control valves to operate.

G. Control Valve: An automatic (electrically operated) valve for control water flow to irrigation system zone. When the system is not in operation, water upstream of the control valve is under static pressure. Watered downstream of the control valve is not under static water pressure.

I. PSI: Is an abbreviation of the phrase pounds per square inch.

K. GPM: Is an abbreviation of the phrase gallons per minute.

1.04 SUBMITTALS

A. At least 30 days prior to ordering materials, the Contractor shall submit to the Architect (in quadruplicate) Samples, Certifications, Shop Drawings and Catalog Cuts, Manufacturer's product data and certified test results for materials as specified below. No materials shall be ordered or delivered until the required submittals have been reviewed and approved by the Architect. Delivered materials shall closely match the approved samples. Approval shall not constitute final acceptance. The Architect reserves the right to reject, on or after delivery, any material which does not meet these Specifications and in accordance with the SUPPLEMENTARY GENERAL CONDITIONS, including but not limited to the following:
   1. Complete Schematic Layout Plans For Entire System, including all irrigation details.
   2. All piping materials, joints and fittings.
   3. Pipe supports.
   4. Valves, sprinkler heads, valve boxes and accessories.
   5. Miscellaneous special fittings.

6. Booster pump and pump appurtences for automatic operations.
7. Sprinkler automatic control system, Controller, Enclosures, Wiring and Rainstat.
8. Soil moisture meter.

1.05 EXAMINATION OF CONDITIONS

A. All areas to be irrigated shall be inspected by the Contractor before starting work and any defects such as incorrect grading or inadequate drainage shall be reported to the Architect prior to beginning this work.

B. The Contractor shall be solely responsible for judging the full extent of work requirements involved, including but not limited to the potential need for storing and maintaining irrigation components temporarily and/or rehandling irrigation components prior to final installation.

C. The Contractor shall fully inform himself of existing conditions of the site before submitting his bid, and shall be fully responsible for carrying out all work required to fully and properly execute the work of the Contract, regardless of the conditions encountered in the actual work. No claim for extra compensation or extension of time will be allowed on account of actual conditions inconsistent with those assumed, except those conditions described in the GENERAL CONDITIONS.

1.06 QUALITY ASSURANCE

A. Comply with requirements of local building codes for prevention of backflow and back-siphonage.

B. Installer Qualifications: Engage an experienced Installer who has completed irrigation systems similar in material, design, and extent to that indicated for this Project that have resulted in construction with a record of successful in-service performance with at least 5 years experience. Irrigation Contractor shall provide necessary licensed plumber and electrician needed to complete the work in accordance with Architect Standards.

C. Listing/Approval Stamp, Label, or Other Marking: On equipment, specialties, and accessories made to specified standards.

D. Listing and Labeling: Equipment, specialties, and accessories that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in "National Electrical Code," Article 100.
   2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

E. Product Options: Irrigation system piping, specialties, and accessories are based on specific types, manufacturers, and models indicated. Components with equal performance characteristics produced by other manufacturers may be considered, provided deviations in dimensions, operation, and other characteristics do not

change design concept or intended performance as judged by the Architect. The burden of proof of product equality is on the Contractor.

1.07 COORDINATION, ORDINANCES, PERMITS AND FEES

A. The work under this Section shall comply with all ordinances and regulations of authorities having jurisdiction.

B. The Contractor shall obtain all necessary permits and arrange for all mandatory inspections. His bid shall include all fees for permits and certificates and all costs in connection with inspection.

C. The Contractor shall include in his bid any charges by the Water and Sewer Department, Duke Energy, or other authorities for work done by them and charged to the Contractor. Notify all municipal departments and/or public utility Architects concerned, of the time and location of any work, which may affect them. Cooperate and coordinate with them in the protection and/or repairs of any utilities.

1.08 DAMAGE TO OTHER WORK

A. The Contractor shall be held responsible for and shall pay for all damage to other work caused by his work or workmen.

B. Repairing of such damage shall be done by the Contractor who installed the work, and as directed by the Architect.

1.09 PROTECTION

A. The contractor shall call and coordinate with NC811 prior to commencing with any trenching work. The Contractor shall use extreme care in excavating so as not to damage or break any water appurtenance. If a casting is found to be broken through no fault of the Contractor, he shall notify the Architect immediately to secure the authorization to replace said apparatus, which he will furnish and be reimbursed for same under the proper item. Should the Contractor, through his own negligence, damage or break a water appurtenance, he shall replace same at his own expense.

B. It shall be the responsibility of the Contractor at the close of each day's work to block all open ends of installed water lines with an inflatable membrane plug or other type plug, to prevent the introduction into the pipe of groundwater, debris, animals and other contaminants.

D. The Contractor shall use extreme care in excavating so as not to damage any other apparent or hidden, subsurface utility, structure or improvement. If any item is found to be broken or damaged through no fault of the Contractor, he shall notify the Architect immediately. Should the Contractor, through his own negligence, damage or break any item, he shall replace same at his own expense.

E. Provide temporary storage of pipe and other materials, in such manner as to prevent damage, and to maintain them in "new" condition until they are incorporated into the work.

F. Provide temporary support, adequate protection and maintenance of all structures, drains, sewers, and other obstructions encountered. Where grade or alignment is obstructed, the obstruction shall be permanently supported, relocated, removed or reconstructed as directed by the Architect.

1.10 OPERATION AND MAINTENANCE INSTRUCTIONS

A. At a time designated by the Architect, the Contractor shall furnish the services of a competent operator to instruct the representative of the Architect in the maintenance and operation of all systems.

B. Upon completion of the work, furnish the Architect, for its approval, five copies of an operating manual containing approved Shop Drawings and Details, and typewritten instructions relative to the care and operation of the equipment, all properly indexed, and bound in a three-ring, hard-cover binder. After Architect, the five manuals shall be delivered to the Architect. Each manual shall contain the following:
1. Table of contents.
2. Description of Irrigation Systems:
    a. Complete schematic drawings of all systems.
    b. Functional and sequential description of all systems.
    c. Wiring diagrams for electrical controllers, valves, and devices.
3. Listing of manufacturers.
4. Manufacturer's data where multiple model, type and size listing are included, clearly and conspicuously indicating those that are pertinent to this installation:

    a. Description: Literature, drawings, illustrations, certified performance charts, technical data, etc. for all irrigation equipment included within the irrigation program.
    b. Operation.
    c. Maintenance, data for inclusion in "Operating and Maintenance Manual":
        (1) Valves, including general-duty, underground, automatic control and valve boxes.
        (2) Sprinklers, sprinkler risers.
        (3) Controls, including controller wiring diagrams.
        (4) Wiring.
    d. Maintenance, including complete troubleshooting charts:
        (1) Parts list including model numbers.
    e. Names, addresses and telephone numbers of recommended repair and service companies;
    f. Guarantee data.
    g. Available water pressure and flow characteristics.
    h. Description of each zone precipitation rate and time required to achieve 1 inch of water per week.

1.11 TESTING

A. Prior to the completion of the work, the Contractor shall cause the entire irrigation system to be tested in the presence of the Architect. The test shall clearly demonstrate that each and every part of the system functions as specified or intended.
   1. Request the presence of the Architect in writing at least forty-eight (48) hours in advance of testing.
   2. Testing shall be accomplished at the expense of the Contractor and in the presence of the Architect.
   3. Prior to testing the irrigation piping shall be protected to prevent arching or slipping under pressure.
   4. All new supply mains, main line piping, or any valved sections thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure that will exist at the point of testing, or 150 psi, whichever is greater. Cap and subject the zone line piping system to a static water pressure of 50 psi above the operating pressure without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for 2.5 hours. Leaks and loss in test pressure constitute defects that must be repaired
      a. Pressure losses shall not exceed 5 percent of starting pressure.
   5. Repair leaks resulting from tests.

B. Part circle spray patterns shall be adjusted as required to provide complete and adequate coverage of the areas to be watered.

C. Automatic and manual features of the irrigation controller shall be tested for satisfactory operation. The controller shall automatically operate each zone in the irrigation system for not less than one-half (1/2) hour during which time each remaining zone shall be added to the automatic cycle by means of manual control switches. If unsatisfactory performance of the controller develops the condition shall be corrected and the testing procedures shall be repeated until satisfactory operation is obtained.

PART 2 - PRODUCTS

2.01 GENERAL

A. All materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of this system. All material averages at the completion of the installation are the property of the contractor and shall removed from the site.

B. Dielectric Pipe Fittings: (joining dissimilar pipe tubing material) Assembly or fitting with insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion. These devices are a combination of copper alloy and ferrous metal; threaded- and solder-end types, matching piping system materials.

Manufactured assembly or fitting, with pressure rating at least equal to that of system and with ends compatible to piping where fitting is to be installed.

2.2 SUPPLY MAIN- CONNECTION TO WATER SYSTEM

A. Contractor shall coordinate exact location of water line connection for irrigation equipment and equipment and materials needed for such a connection. A secondary main shall be provided to domestic water service. Contractor to make all connections required to provide water to service irrigation system and prevent contamination of domestic water.

2.3 PIPING - PVC MAIN LINE 3" AND SMALLER

A. All main line piping from the point of connection to all of the electric zone control valves shall be PVC 1120, SDR 21, Class 200 type/grade PVC 1120 as manufactured by Slone, Cresline, JM, Triangle or approved equal. All PVC pipe and PVC fittings, shall meet the following requirements:
   1. PVC Pipe shall conform to the requirements of ASTM D 2241, PVC 1120 SDR 21, Class 200
   2. PVC Fittings: Solvent welded socket type fittings shall conform to requirements of ASTM D 2466 socket-type, Schedule 40 and ASTM D 2467, Schedule 80, socket-type. Threaded type fittings shall conform to requirements of ASTM D 2464, Schedule 80 threaded type. All main line pipe fittings shall be Schedule 80.
   3. Solvent Primer: ASTM F 656 primer..
   4. Solvent Cement: Solvent cement shall conform to the requirements of ASTM D 2564 and F-493 for potable water, pressure, gas conduit, and drain pipes. Application temperature shall be 35 to 110 degrees Fahrenheit.
   5. PVC joint assembly shall be in accordance with ASTM D 2855-83, "The Standard Practice for Making Solvent-Cemented Joints with Poly Vinyl Chloride, PVC Pipes and Fittings."

B. Contractor shall provide all PVC adapter x male adapter fittings necessary to complete the system.

C. All nipples to be schedule 80 PVC.

D. Main line piping and wiring shall be within PVC pipe sleeves installed under roadways and walks in the current NCDOT DDI project. Water velocity in pipe shall not exceed 4 feet per second.

2.4 PIPING – POLYETHYLENE 2" AND SMALLER

A. Zone Line Piping and distribution line piping, shall be Polyethylene Pipe (PE). Polyethylene Pipe (PE) shall be as manufactured by HYCOA, Charter Plastics, Sclarpipe, or approved equal. All piping shall be certified by NSF for use in potable water service. All polyethylene pipe and polyethylene fittings, shall meet the following requirements:

1. Polyethylene Pipe (PE) shall be High Density Polyethylene, rated at 160 psi. SIDR 7, meeting the requirements of ASTM D 2239.

B. Fittings for Joining polyethylene pipe shall be insert type PVC fitting. Fittings shall have the same pressure rating as the polyethylene pipe. Fittings shall be as manufactured by Sloan, Spears, Cresline or approved equal. All Insert Fittings shall be certified by NSF for use in potable water service.
   1. All thermoplastic Insert Fittings shall be produced from PVC Type I, Cell Classification 12454 meeting ASTM Standard D 1784, and shall be manufactured according to ASTM D 2609 for use with polyethylene pipe produced to ASTM D 2104 and D 2239.

C. Polyethylene pipe shall be affixed to PVC insert fittings and made watertight using Stainless Steel Clamps. Stainless Steel Clamps shall be as manufactured by Lox-On, Ideal, Lasco, or approved equal. One stainless steel clamp shall be used on either side of the PVC insert fittings for pipe sizes 3/4 inch and 1 inch. Two stainless steel clamps shall be used on either side of the PVC insert fittings for pipe sizes 1-1/2 inch and 2 inch. All clamps shall be Stainless steel, type 304.

D. Contractor shall provide all proper male adapter x insert fittings and PVC adapter x insert fittings to complete the system.

E. Zone line piping and wiring shall be within PVC pipe sleeves installed under roadways and walks in the current NCDOT DDI project. Water velocity in pipe shall not exceed 4 feet per second.

2.5 GRAVEL FILL

A. Gravel fill material will be as specified in the Standard Specifications.

B. Gravel shall be used as a base foundations support beneath concrete slabs and exterior irrigation ground control equipment in locations indicated within the Contract Documents, Plans And Details.

2.6 CRUSHED STONE

A. Crushed stone shall be three-quarter inch as specified under ASTM C 33, crushed gravel.

B. Crushed stone used for drain valve, Electric valve, valve boxes, flush valves, air release valve drainage pits, support, and below the spray heads etc. and at locations indicated within the Contract Documents, Plans And Details.

2.7 SAND

A. Sand shall conform to the requirements of ASTM C 33, sand.

B. Sand and shall be used as a support and cushion, underneath and around irrigation piping

2.8 ISOLATION VALVES

A. Gate valves shall be 150 pound bronze valves with solder-joint ends and body material shall conform to ASTM Standard Specifications for Composition Bronze or Ounce Metal Castings, B62-70. Valves shall have union bonnet, rising stem, inside screw, and solid wedge gate. Stems shall be made of wrought silicon bronze. If the manufacturer does not furnish this stem material in the class specified, the valves shall be furnished in the next higher class in which the stem material is available.

2.9 BACKFLOW PREVENTER

A. A backflow preventer for the irrigation system shall be installed in the water supply line. The backflow preventer shall have a bronze body with threaded ends. The backflow preventer shall be provided with ball joint valves on each end and a strainer on the inlet end, and test kit to form a complete unit. A Reduced Pressure type of backflow preventer mounted and installed shall be furnished complete in a location approved by the Architect.

B. Reduced Pressure type of backflow preventer shall be sized to accept the water volume GPM of the largest zone within the system. Reduced pressure backflow preventer shall be a 909RPDA type as manufactured by Watts Industries, Inc., or approved equal. Backflow preventer shall meet all State, City and Local standards and requirements for Reduced Pressure type of backflow preventer for irrigation system applications.

C. Backflow preventer shall be sized as necessary to complete the design. Unit shall be sized so that velocity of water remains below 5 feet per second and maximum allowable gallons of water per minute remain below manufacturer's recommended limits for the largest irrigation system zone size.

D. Water meter will be a turbine water meter M-H-R-type as manufactured by Hersey or approved equal with Class 125 flanges at each end. Contractor shall be responsible for mounting water meter as approved by the Architect.

E. Water meter shall meet all local water authority standards. Unit shall be sized so that velocity of water remains below 5 feet per second and maximum allowable gallons of water per minute remain below manufacturer's recommended limits for the largest irrigation system zone size.

2.10 ZONE CONTROL VALVES

A. The valve body and bonnet shall be constructed of heavy cast brass, diaphragm shall be of nylon reinforced buna-n rubber. All other internal parts shall be made of bronze, brass, and stainless steel to ensure corrosion resistance.

B. The remote control valve shall be a normally closed, 24 VAC 50/60 cycle solenoid actuated globe/angle pattern design capable of having a flow rate not to exceed manufacturer's recommended limits. The valve shall be sized so that Water velocity

in pipe shall not exceed 5 feet per second. The valve pressure rating shall not be less than 200 psi.

1. Size shall be 1” valve for zones 5 gpm to 12 gpm in size.
2. Size shall be 1-1/2” valve for zones 25 gpm to 40 gpm in size.

D. The valve shall have both internal and external manual open/close control (internal and external bleed) for manually opening and closing the valve without electrically energizing the solenoid. The valve shall have internal manual bleed to prevent flooding of the valve box. The valve shall house a fully-encapsulated, one-piece solenoid. The solenoid shall have a captured plunger with a removable retainer for easy servicing, and a leverage handle for easy turning. This 24 VAC 50/60 Hz solenoid shall open with 19.6 VDC minimum at 200 PSI. At 24 VAC average inrush current, it shall not exceed .41 amps. Average holding current shall not exceed .23 amps. The valve shall have a contamination proof (CP) self-flushing nylon filter screen located at the valve inlet to filter out grit and prevent clogging of hydraulic control ports and assure reliable operation

E. The valve shall have a stainless steel flow control stem and cross handle for regulating or shutting off the flow of water. The valve must open or close in less than one minute at 200 PSI and less than 30 seconds at 20 PSI. The valve must be a must be a slow closing type to ensure smooth and shock free operation.

F. The valve construction shall be such as to provide for all internal parts to be removable from the top of the valve without disturbing the valve installation.

G. All electric control valves shall be located within Valve Boxes as indicated below. Final location of equipment shall be as approved by the Architect.

2.11 BLOW OUT VALVE

A. Blow out valve shall be a quick coupling valve.

B. Quick coupling valve for system winterization shall be located at the backflow preventer location, downstream of the backflow preventer. There shall be a shut off valve capable of shutting the system closed between the backflow preventer and the quick coupling valve. This shut off valve shall be in a closed position when compressed air pressure is applied for system winterization.
   1. Air Pressure for system winterization, for irrigation rotary and spray zones shall never exceed 80 psi.
   2. Opening sequence for low voltage electric zone valves. Air Pressure for system winterization shall be applied to the electric zone valve closest to the backflow preventer, firstly, continuing in sequence to the electric zone valve farthest away from to the backflow preventer.

2.12 QUICK COUPLING VALVES AND COUPLERS

A. The valve body shall be of cast brass construction with a working pressure of 150 psi. The valve seat disc plunger body shall be spring loaded so that the valve is

normally closed under all conditions when the coupler is not inserted. Corresponding Valve Key by same manufacturer shall be included.

B. Each quick coupling valves shall have a corresponding valve key by same manufacturer. Each corresponding valve key shall have a Hose Swivel by same manufacturer or approved equal.

C. The valve seat disc plunger body shall be spring loaded so that the valve is normally closed under all conditions when the corresponding Valve Key coupler is not inserted. The valve body construction shall be such that the coupler seal washer may be removed from the top for cleaning or replacement without disassembling any other parts of the valve.

D. The quick coupling valve shall be equipped with a locking cover. Each locking cover shall include the locking cover key.

E. Complete quick coupling valve/ Hose Swivel/valve box assemblies shall be included within this irrigation system. Location to be established by the Architect.

2.13 SPRINKLER RISERS SWING JOINT

A. All 1" swing joint assemblies for sprinkler heads shall be pre-assembled units manufactured of PVC material. Swing shall consist of (4) 90 degree elbows and (1) twelve inch long riser nipple with 90 degree bend on one end.

B. PVC swing joint connections shall consist of Buttress Threads and double "0" Rings providing leak-free 360 degree adjustment. Wall construction shall be Schedule 80+ with special emphasis at inside corners on change of direction fittings.

C. PVC Swing joint assemblies shall be made from virgin PVC Type 1, Cell Classification 12454-B material listed for potable water conveyance by NFS. Working pressure shall be 200 psi combined static and surge.

D. All PVC swing joints shall be factory assembled.

E. If backfill material removed from sprinkler location contains rocks larger than 3/4 inch in size or heavy clay, all P.V.C. and galvanized swing joint assemblies and sprinklers attached shall be completely backfilled with sand to within 6 inches of final grade and loam to the surface.

2.14 SPRINKLER RISERS ASSEMBLY (FOR SPRAY HEADS)

A. SHRUB AND GROUND COVER AREAS: Risers for spray heads shall be thick wall poly (also called "Funny Pipe"), specifically designed and manufactured to be used as a pop-up head riser, shall be used to connect the pop-up spray sprinklers to the zone lines. Riser thick wall poly “Funny Pipe” shall be as manufactured by Toro, Rainbird, Hunter or approved equal. barbed insert x male ells (2 per sprinkler unit) shall be used. One Lox-On clamp shall be used for each barbed connection. Zone

line nipples shall be sized as necessary. A minimum of twelve inches (12") of thick wall poly pipe will be needed for each unit connection.

2.15 SPRINKLER ROTARY HEADS 6', 8', 10' 12' and 15' RADIUS.

A. The full or part circle pop-up spray type sprinkler shall be capable of covering 6', 8', 10' 12' and 15' radius at a pressure rating of 30 psi.

B. The sprinkler body, stem, nozzle, and screen shall be constructed of heavy-duty, ultra-violet resistant plastic. It shall have a heavy-duty stainless steel retract spring for positive pop-down and a ratcheting system for easy alignment of the pattern.

C. The sprinkler shall have a matched precipitation rate (MPR) over the range of radii, brass nozzle with an adjusting screw capable of regulating the radius and flow. The sprinkler shall be capable of housing under the nozzle protective, non-clogging filter screens or pressure compensating (PCS) screens. The screen shall be used in conjunction with the adjusting screw for regulating. The 6" and 12" models shall have both a side and bottom 1/2" Female National Pipe Thread inlet (FNPT) for ease of installation. The 4" models shall have bottom 1/2" Female National Pipe Thread inlet (FNPT) only.

D. The sprinkler shall have a soft elastomer pressure activated co-molded wiper seal for cleaning debris from the pop-up stem as it retracts into the case to prevent the sprinkler from sticking up and to minimize "flow-by".

E. The sprinkler shall have a Flush Plug pre-installed. The plug shall prevent debris from clogging the sprinkler during installation and allow for system to be flushed before nozzling.

F. Nozzle patterns for quarter, third, half, two thirds, three quarters, and full circles shall be as necessary to complete the work. Nozzle changes which are necessary to make the distribution pattern (precipitation rate) more even shall be considered as an incidental item and part of this work.
   1. Shrub areas shall primarily use the 4" pop-up body.
   2. Ground cover areas shall use the 12" pop-up body.
   3. Irrigation Head Pattern & Coverage: Irrigation heads shall provide coverage for all, ground cover, shrub & tree areas. Spray patterns shall be laid out so as not to wet adjacent pavement areas. All heads shall have 100% (head to head) coverage for side strip, 6 feet, 8 feet, 10 feet, 12 feet & 15 feet radius.
   4. Operation: The fixed orifice nozzles shall provide fixed flows and areas of coverage at rated pressure requirements in both full-circle and part-circle types. Part-circle nozzles shall water fractional portions of a circle in 10° increments between 60° and 270° as required. Flow discharge of part-circle nozzles shall be directly proportional to the arc covered expressed as a percentage of a full-circle of the same radius; i.e. a half circle 50% of a full circle, etc.; and this ratio shall not be exceeded by more than 15%.

2.16 IRRIGATION CONTROLLER

A. The controllers shall have a number of stations equivalent to one station per each electric zone valve as manufactured by Rainbird (ESP-LX Plus Series), Toro (Vision II Plus Series), Weathermatic (SL Series) or approved equal. The irrigation controller shall be a hybrid type, that combines electromechanical and microprocessor based circuitry capable of fully automatic, semi-automatic, and manual control of irrigation systems. The controller shall be housed in a wall-mountable, heavy duty, plastic, weather resistant cabinet with a key-lock door and shall be suitable for indoor or outdoor applications. The irrigation controller shall be specifically designed for commercial/institutional applications. Automatic controller shall have an equal number of valves and stations. One station per valve.

B. The controller shall utilize a three-prong, plug-in style transformer with a three (3) wire secondary cable (including a ground wire with green colored insulation) that shall be six (6) feet in length. The controller shall operate on 117 VAC +/- 10%, 60Hz and shall be capable of operating up to two 7 VA 24 VAC electric remote control valves per station plus a master valve or a pump start relay.

C. The controller shall have an electronic, diagnostic circuit breaker that shall sense a station with an electrical overload or short circuit and shall bypass the station and shall continue to operate all other stations in the program in sequence. The controller shall utilize an indicator light to alert the operator to the electrical problem and shall also display the problem station until the operator depresses the front-face-panel-mounted reset button.

D. The controller shall have a minimum of four separate irrigation programs (A, B, C, & D) which may be programmed for different start times, watering days, and station watering time lengths. Each program shall be capable of up to 6 starts times per day. The controller shall feature a range of operating day cycles of 2, 3, or 5-day fixed, or a 7-day variable (week day) Custom Schedule.

E. The controller shall have the correct number of zones equaling one zone on the controller for each electric zone valve used in the field. Each zone shall be capable of an operating range of from 0 to 99 minutes in one-minute increments for those stations assigned to Programs A, B, or C. Long timing stations shall have an operating range from 0 to 10 hours in 6-minute increments.

F. The controller shall have a 365-day calendar with a day-of-the-month OFF feature allowing the operator to set specific dates to be off up to 30 days in advance. A date set to OFF shall override the normal, repeating day schedule and shall remain off on that date, and shall display to the operator that the current day is a non-water day.

G. The controller shall have a master valve/pump start circuit that shall provide 24-volt AC power for either a master valve or pump start relay when any of the controller's stations are in operation. The controller shall provide the operator the capability to disable concurrent operation of the master valve/pump start circuit from any station desired.

H. The controller shall have a sensor circuit for connection to a rain sensor and to an underground moisture sensor system. The controller shall have an indicator light that shall be on whenever output current to the field valves is being restricted by a sensor system. The controller shall have a front-face-panel-mounted sensor bypass switch that shall allow the operator to override the sensor if desired.

I. The controller shall have a battery recharging circuit and a factory-supplied 9-volt rechargeable battery. A fully charged battery shall maintain clock time and program memory up to one week during a power outage. In the event of memory loss, a default program shall begin operation 8 hours after power resumes.

2.17 VALVE ACCESS BOX

A. Valve boxes shall be constructed of a rigid combination of polyolefin and fibrous components especially compounded for underground enclosures. Superflexon plastic material shall be chemically inert and normally unaffected by moisture, corrosion and the effects of temperature changes. Superflexon shall also have a relatively high tensile strength with light weight because of its solid structural material. Units shall include any extensions necessary to complete the work. The cover shall be capable of sustaining a load of 1,500 psi. Valve box extensions shall be by the same manufacturer as the valve box. Final location of valves and valve boxes shall be as approved by the Architect. Valve boxes shall be located away from pedestrian walks, preferably in ground mulch areas.

B. The twelve inch standard valve box shall be 12 inches deep with a measurement of 15 inches long by 10 inches wide. The valve box shall include a locking cover which shall have a slightly mottled, grass-like green color that will blend into turf.

C. The twelve inch jumbo valve box shall be 12 inches deep with a measurement of 20 inches long by 13 inches wide. The box shall include a locking cover which shall have a slightly mottled, grass-like green cover that will blend into the turf.

D. The ten inch round valve box shall be 10 inches in diameter by 10 inches deep. The box shall have a lockable cover slightly mottled, grass-like that will blend into the tuff.

E. The 5-1/4 inch round valve box shall be 5-1/4 inches in diameter by 24-1/2 inches deep with a green cover which will blend into the tuff.

2.18 RAIN SHUT OFF - Wireless Rain-Click

A. Rain shut-off shall be plastic in construction with adjustable interruption point and attached mounting bracket. Rain shut-off shall be Wireless Rain-Click as manufactured by Hunter Products or equal.

B. One rain sensor shall be supplied for each controller. Install the receiver unit next to your irrigation controller, then install the transmitter anywhere that the device can receive representative rainfall

C. Mount unit within 300' from the Receiver Unit with Built-in Bypass Switch on Receiver Panel.

D. Sensor Dimensions: 3.25" diameter x 4" high; Wiring: normally closed or normally open; Operational Temperature: 32°F - 130°F; Receiver Power: 22-28 VAC/VDC, 100 mA (from timer transformer); Switching capabilities: Single Pole Double throw - 24 volts 3 amps.

E. The rain shut-off shall be mounted in a location as approved by the Architect.

2.19 SOIL MOISTURE SENSOR

A. All landscaped areas irrigated as part of this project shall be automatically controlled by four Watermark Electronic Modules as manufactured by Irrometer Company, Inc. or approved equal. There shall be four locations for the soil moisture sensors. Location one shall be within the lawn areas on the south or west side of the building. Location two shall be within the lawn areas on the north or east side of the building. Location three shall be within the shrub beds on the south or west side of the building Location four shall be within drip irrigation area. Each location shall have two modules. Location one and two shall have both modules 4” below finished grade. Location three shall have the modules 8” and 12” below the surface. Location four shall have the modules 8” and 12” below the surface.

B. The irrigated area shall be divided into two moisture control areas (Hydrozones) based on similar water requirements.

C. The Hydrozone shall contain two (2) Watermark soil moisture sensors placed in the active root zone of the plant being controlled for that Hydrozone. See irrigation details for installation. Watermark sensor locations shall have two (2) wires (AWG-UF #18 or larger) which run from the sensor location to the Watermark Electronic Module. Refer to irrigation plan for system location (typically adjacent to irrigation controller). Contractor shall run a separate common wire for valve group 1 and a separate common wire for valve group 2.

D. All wire connections shall be fully waterproof. All installation and wiring shall be in accordance with the Watermark Electronic Module installation booklet included with the system. A copy of this booklet shall be included in the master operations and the maintenance manual turned over to the maintenance contractor or the Architect at the completion of construction and acceptance of the system.

E. All soil moisture sensors shall be placed within a plastic valve box in accordance with the irrigation contract documents.

2.20 BOOSTER PUMP ASSEMBLY

A. The contractor/designer may choose to select irrigation equipment such that existing water pressure is insufficient to produce minimum water pressure at the farthest irrigation head in accordance with manufacturers’ recommendation. The

contractor/designer may choose to install a booster pump to increase existing water pressure.

A. The pump shall be base-mounted, single-suction, single-stage, enclosed impeller, electrically driven centrifugal type pump. Pumps shall be made of cast iron and shall be bronze fitted. Casing shall be designed for not less than 125 psi. High points in the casing shall be provided with manual air-vent cock, low points shall be provided with a drain plug. Shaft shall be steel, turned and round, and shall have bronze shaft sleeves. Bearings shall be ball type, roller type, or oil -lubricated bronze-sleeve type. Pump shall be accessible for servicing without disturbing piping connections. Pump motor shall be close coupled or connected to the pump through a flexible coupling. Unless otherwise specified or required, pump seal shall be mechanical type. Pump motor shall have ample capacity to prevent overloading with pump operating at any point on its characteristic curve. Pump and motor shall be mounted on a common cast-iron or fabricated steel base having lipped edges and tapped drainage openings. Pumps shall be installed on suitable foundation, properly leveled, ground-ed in, and realigned before operation. Gauges and gaugecocks shall be provided at pump suction and discharge connections. The pump shall have a built-in starter. The pump shall have a heavy duty pressure switch starter.

B. It is estimated that a Pump shall be capable of boosting existing pressure 30psi at 60 gpm as manufactured by Starite, Grundfos Pump Corp. Floboy, or approved equal. Pump assembly shall be provided as a single, complete, skid mounted unit.

C. Pressure tank control shall be Wellrite WR 120 Series or approved equal. Cyclestop shall be by Cyclestop CSV-2W series or approved equal. Relay Switch shall be by Batron PSR 123 series or approved equal.

D. Pump and pressure tank shall have unions at both ends of each unit for easy disconnect.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION METHODS

A. Examine all contract documents applying to this Section noting any discrepancies and bringing the same to the attention of the Architect for timely resolution. The irrigation system shall be installed as shown on the Drawings and in accordance with these Specifications.

B. Make all field measurements necessary for the work noting the relationship of the irrigation work to the other trades. Coordinate with other trades (landscaping and other site work trades). Project shall be laid out essentially as indicated on the Irrigation Plans, making minor adjustments for variations in the planting arrangement. Major changes shall be reviewed with the Architect prior to proceeding.

C. At all times, protect existing irrigation, landscaping, paving, structures, walls, footings, etc. from damage. Any inadvertent damage to the work of another trade shall be reported at once. The workmanship shall be first-class in every respect and neat in appearance. All work shall meet the requirements of the local codes, and other authorities having jurisdiction over the work.

1. Where irrigation mains or branch lines are installed through existing paved areas to remain, the subbase, base and paving removed shall be replaced with material of equal quality. Payment for replacement shall be under other appropriate items in the contract.
2. Loam encountered within the limits of trench excavation for irrigation mains and branch lines shall be carefully removed to the lines and depths established by the Engineer and stockpiled for subsequent replacement in the upper six inches (6") of the trench from which it is excavated. Such removal and replacement of the quantities of loam shall be considered incidental to the irrigation system and no additional compensation will be allowed therefore.
3. All excavation and backfill operations shall conform to the details shown on the Drawings and the applicable provisions in specifications.
4. Pipe shall be laid in trenches to the lines and grades established by the Engineer and to provide sufficient slope (minimum 1%) for main line to drain the system for winterization. Prior to placing pipe, the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel. During backfill operations the pipe shall be rigidly supported so that no movement of or damage to the pipe or joints will result.
5. Cut plastic pipe with handsaw or pipe-cutting tool, removing all burrs at cut ends. All pipe cuts are to be square and true. Bevel cut end as required to conform to Manufacturer's Specifications.
6. The Contractor shall provide all metal pipe adapter X insert and insert X PVC adapter fittings that may be required as well as other adapter fittings that may be required to complete the system.
7. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. At times, when installation of the piping is not in progress, the open end(s) of the pipe shall be closed by a watertight plug or other means. All piping, which cannot temporarily be joined, shall be sealed to make as watertight as possible. This provision shall apply during the lunch hour as well as overnight. Pipe not to be installed that day shall not be laid out. Should water enter the trench during or after installation of the piping, no additional piping may be installed or back filled until all water is removed from the trench. Pipe shall not be installed when water is in the trench, when precipitation is occurring, or when the ambient temperature is at 35 degrees F or below. PVC pipe shall be snaked in the trench to accommodate for expansion and contraction due to changes in temperature. All lines shall be thoroughly flushed out prior to attachment of terminal fittings.
8. In installing irrigation pipe the Contractor shall route the pipe as necessary to prevent damage to tree roots. Where trenching must occur near trees, the Contractor shall provide proper root pruning and sealing methods to all roots 1 inch and larger.
9. Throughout the guarantee period it will be the responsibility of the Contractor to refill any trenches that have settled due to incomplete compaction.

10. Pulling of pipe will be allowed provided soil is suitable and specified depth of bury can be maintained.

3.2 PLASTIC PIPING

A. Drawings are generally diagrammatic and indicative of work to be installed. Contractor shall design, run and arrange piping subject to modifications as required to suit field conditions to avoid interference with work of other trades, or for proper, convenient and accessible location of all parts of piping systems. Due to small scale of Drawings, all required offsets, fittings, valves, drains, etc., may not be indicated. Refer to and carefully check all Drawings and Details noting conflicts with work of other trades, and arrange work accordingly, furnishing all offsets, fittings, valves, drains, etc., required to meet such conditions.

B. Pipe shall be laid in trenches to lines and grades such that the system drains to the drain valves which are at the low points in the system. Prior to placing pipe, the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe. During backfilling operations the pipe shall be rigidly supported so that no movement of or damage to the pipe or joints will result. For PVC pipe there shall be a 6" sand envelope surrounding the pipe, as specified.

C. Foreign material shall be prevented from entering the irrigation system during installation. Immediately prior to assembling, all pipes, valves, and fittings shall be cleaned. All unattached ends of pipe, fittings, and valves shall be plugged or capped pending attachment of additional pipe or fittings. All lines shall be thoroughly flushed out prior to attachment of terminal fittings.

D. Pipe shall be laid on undisturbed trench bottom provided suitable base is available - no rock larger than 1 inch or sharp edges; if not, excavate to 2 inch below pipe invert and provide sand base or crushed stone upon which to lay pipe.

E. Back filling shall be accomplished as follows: the first 10-inch of backfill material shall contain no foreign matter and no rock larger than 1 inch in diameter. Carefully place material around pipe and wire and tamp in place. Remainder of backfill shall be laid-up in 6-inch (maximum) lifts and tamped to compaction with mechanical equipment matching adjacent undisturbed area. Frozen material shall not be used for backfill.

3.3 ELECTRICAL WIRE CONDUIT INSTALLATION

A. Electrical conduit shall be installed in all non-soil areas, as well as for all above ground wiring to controllers and rain sensor in accordance with details.

3.4 VALVE BOX INSTALLATION

A. Furnish and install a valve access box for each electric valve, quick coupling valve, isolation valve, flushing valve, air relief valve, soil moisture meter, and wire splice.

B. All valve access boxes shall be installed on a minimum 4-inch crushed stone base. Finish elevation of all boxes shall be at grade. All crushed stone to be supplied by the Contractor and installed before valve box. Crushed stone shall not be poured into previously installed valve boxes.

C. Valves shall not be installed with stems below the horizontal. Valves shall be set plumb and supported adequately in conformance with instructions of the manufacturer.

3.7 ELECTRIC CONTROL VALVES

A. Electric Control valves and valve boxes shall be remotely located at the edge of lawn areas, planting beds, shrub area etc. whenever possible. Coordinate location of Electric Control valves and valve boxes with Architect.

B. Control valves in pipe lines shall be installed in valve boxes extending from grade to valve body, with a minimum of one foot and six inches cover measured from finish grade to top of valve stem. Valve boxes shall be arranged for easy adjustment and removal. Cluster valves together in groups of two or three whenever possible.

C. Adjust zone valve operation after installation using flow control device on valve.

D. Control valves shall be installed on a level crushed stone base. Grade of bases shall be consistent throughout the project so that finish grades fall within the limits of work. Valves shall be set plumb with adjusting handle and all bolts, screws and wiring accessible through the valve box opening.

3.8 WIRING INSTALLATION

A. Wiring shall be installed along with the main line. Multiple wire bundles shall be cinched together at maximum 12-foot centers using plastic cable cinches and shall be laid beside, and at the same invert as, the irrigation lines. Sufficient slack for expansion and contraction shall be maintained and wiring shall at no point be installed tightly. Provide an additional 8 inches to 12 inches slack at all changes of direction. Wiring in valve boxes shall be a sufficient length to allow the valve solenoid, splice, and all connections to be brought above grade for servicing. This additional slack shall be coiled for neatness in the valve box. Each valve shall have a separate wire back to the controller.

B. Wire shall not be installed directly off the roll. Wire must be first laid out and then installed. Specified depth of burial is to be maintained. All wire shall be laid in trenches and shall be carefully back-filled to avoid any damage to the wire insulation or wire conductors themselves. In areas of unsuitable material, the trench shall have a 2 inches layer of sand or stone dust on the bottom before the wires are laid into the trench and back-filled. The wires shall have a minimum of 12 inches of cover. Wire not to be installed that day shall not be laid out.

C. An expansion curl shall be provided within 6 inches of each wire connection to a solenoid and at least every 100 feet of wire length on runs more than 100 feet in

length. Expansion curls can be formed by wrapping five (5) turns of wire around a 1-inch diameter or larger pipe and then withdrawing the pipe.

D. Provide a common ground wire of white color. No white color shall be used for power wire. Landscape and turf zone wires shall be red, drip zones shall be orange and spare wiring shall be blue in color.

E. Contractor shall provide a complete wiring diagram showing wire routing for the connections between the controller and valves. See section one for the inclusion of wiring diagram in operation and maintenance manuals.

3.9 CONTROLLER INSTALLATION

A. Contractor shall coordinate the location of irrigation site controllers and controller boxes and Rainstat. Contractor to wire valves, rain sensors, soil moisture meter, and booster pump into controllers and set proper program. The irrigation controller shall be installed in accordance with the manufacturer's recommendations, and as specified herein.

B. Wire all controllers to 120-volt electrical supplies provided for the controllers by an Electrical Contractor in mechanical room but included as part of this work.

C. Wiring inside controller cabinets shall be consistent throughout the control system, i.e. grounding shall be connected to same posts, etc. Keys shall be turned over to Architect. All wiring inside building shall be within an EMT metal conduit.

3.10 SPRINKLER INSTALLATION

A. Contractor shall coordinate as to location of All sprinklers.

B. Sprinkler connections shall be installed on swing joints as detailed on the Drawings and specified herein. All sprinklers shall be installed in accordance with the manufacturer's recommendations. Large rotary athletic field sprinklers shall be installed on 1-inch PVC swing joints, minimum 12-inches in length.

C. Install sprinklers at heights indicated. Adjust sprinkler zone pressure with flow control on valve.

D. Locate part-circle sprinklers to maintain a minimum distance of 4 inches (100 mm) from walls and 2 inches (50 mm) from other boundaries, unless otherwise indicated.

3.11 CONNECTIONS

A. Connect piping to sprinklers, devices, valves, control valves, specialties, and accessories to provide a fully operational irrigation system as part of this work.

B. Connect water supply to irrigation system. All plumber’s assistance needed to complete the work shall be included as part of this section.

C. Electrical Connections: Connect to power source, controllers, and automatic control valves to provide a fully operational irrigation system. All Electrician's assistance needed to complete the work shall be included as part of this section.

D. Grounding of all systems shall be included as part of this section.

3.12 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing code and health department authorities with jurisdiction.

B. Do not install bypass around backflow preventer.

C. Install backflow preventer in accordance with manufacturers recommendations and per approved Shop Drawings. Contractor shall install unions for easy disconnect.

3.13 CLEANING AND ADJUSTING THE SYSTEM

A. At the completion of the work, all parts of the installation shall be thoroughly cleaned. All equipment, pipe, valves and fittings shall be cleaned of grease, metal cuttings and sludge that may have accumulated by the operation of the system for testing. Flush dirt and debris from piping before installing sprinklers and other devices. Nozzles & screens shall be removed, cleaned and reinstalled in heads not functioning properly.

B. Adjustment of the sprinkler head height, remote control valves and automatic equipment prior to completion of the installation to provide optimum performance and balance throughout the irrigation system. Minor adjustments (cleaning around sprinklers, valve boxes and markers etc. including protection from vandalism) will be made after acceptance of the system and during the warranty period.

C. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

D. Adjust settings of controllers and automatic control valves.

E. Adjust height of all sprinkler heads in accordance with proper head alignment to finished grade.

3.14 COMMISSIONING

A. Starting Procedures: Follow manufacturer's written procedures. If no procedures are prescribed by manufacturers, proceed as follows:
   1. Verify that specialty valves and their accessories have been installed correctly and operate correctly.
   2. Verify that specified tests of piping are complete.
   3. Check that sprinklers and devices are correct type.

4. Check that damaged sprinklers and devices have been replaced with new materials.
5. Energize circuits to electrical equipment and devices.
6. Adjust operating controls.

B. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinklers are adjusted to final position.

3.15 DEMONSTRATION

A. Demonstrate to Engineer that system meets coverage requirements and that automatic controls function properly.

B. Demonstrate to maintenance personnel operation of equipment, sprinklers, specialties, and accessories. Review operating and maintenance information.

C. Provide 7 days' written notice in advance of demonstration.

3.16 RECORD DRAWINGS

A. The Contractor shall provide and keep up to date a complete "As-Constructed" record set of blue line prints that shall be corrected as the work progresses, and show every change from the original drawings and specifications and the actual "As-Constructed" dimensions and kinds of equipment. The Contractor shall be supplied two (2) sets of prints for this purpose. These sets of drawings shall be kept on the site and shall be used only as a record set.

B. These drawings shall also serve as work progress sheets, and the Contractor shall make neat and legible annotations thereon as the work proceeds, showing the work as actually installed. These drawings shall be available at all times for inspection and shall be kept in the Contractor's job site office.

C. The Contractor shall provide two (2) prints of the Record Drawings to the Architect.

D. Record drawings shall show the locations of all piping, valve boxes, valve markers, air relief valves, controllers, wire trenches, 24 volt and 120 volt wire paths and all pertinent material buried and not visible to the eye. Record drawings shall indicate dimensions from two (2) permanent points of easily identifiable nature, if possible, such as sprinkler heads, permanent markers, concrete pads, corners of buildings, large caliper trees, etc.

E. On or before the date of final acceptance, the Contractor shall deliver the corrected and complete "As-Constructed" plans to the Architect. Delivery of the plans will not relieve the Contractor of the responsibility of furnishing required information that may be omitted from the plans. Final payment will not be made until these plans are delivered to the Architect.

3.17 GUARANTEE

A. The Irrigation Contractor shall give the Architect a written guarantee to make good any and all faults and defects in the plumbing and irrigation system due to defective or improper materials or workmanship that may appear within one year from the date of final acceptance by the Architect and he shall make all changes within the guarantee period which are required to put the system in proper condition and operation, without cost to the Architect.

B. The Contractor shall repair promptly all failures in the construction and operation of such project and appurtenances which may occur before the expiration of such guarantee period, and all defects, settlements, and irregularities of the project and appurtenances, other projects and drains, pipes, mains or conduits, curbs, land, turf, or of any structures on the line of the project, or adjacent thereto, occurring before the expiration of such period, and caused or affected by work under this contract.

3.18 WINTER BLOW OUT

A. The system shall be drained by purging with compressed air. The Contractor shall be responsible for winterizing the irrigation system during the one (1) year warranty period and starting up the system the following Spring. The system warranty includes one full shutdowns and one full start ups.

END OF SECTION

SECTION 329113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

B. Related Requirements:
   1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
   2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
   3. Section 329300 "Plants" for placing planting soil for plantings.

1.3 ALLOWANCES

A. Preconstruction and field quality-control testing are part of testing and inspecting allowance.

1.4 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated. Specific directives as to backfill composition found in the Contract Documents take precedence.

C. CEC: Cation exchange capacity.

D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

F. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

G. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

H. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

I. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

J. SSSA: Soil Science Society of America.

K. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

L. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

M. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

N. USCC: U.S. Composting Council.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Schedule and conduct conference prior to commencement of site clearing operations. Conduct conference at project site, unless otherwise arranged.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:

    a. Manufacturer's qualified testing agency's certified analysis of standard products.

b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

C. Field quality-control reports.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1. Laboratories: Subject to compliance with requirements, provide testing by the following

a. NCDA&CS Agronomic Services Division, 4300 Reedy Creek Road, Raleigh, NC 27607

2. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.

1. Notify Architect seven days in advance of the dates and times when laboratory samples will be taken.

2. Test existing, on-site soils in protected areas. Gather one sample for each 400 square feet, distributing the sampling locations evenly; mix the samples for each protected area for a single test.

3. Test existing, on-site soils in undisturbed areas. Gather one sample for each 400 square feet, distributing the sampling locations evenly; mix the samples for each undisturbed area for a single test.

4. Test existing, on-site subsoil. Gather one sample for each 400 square feet, distributing the sampling locations evenly; mix the samples together into five separate geographically oriented submissions for testing (five separate tests).

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.10 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.

1. Number and Location of Samples: According to “Preconstruction Testing” article above.
2. Procedures and Depth of Samples: According to testing authority instructions
3. Division of Samples: Split each sample into two equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.11 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.

B. Physical Testing:

1. Soil Texture: Soil-particle, size-distribution analysis by the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":

a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
b. Hydrometer Method: Report percentages of sand, silt, and clay.

2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D698 (Standard Proctor).

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13 including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm
14. Soluble-salts ppm.

15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for organic matter increase or decrease; pH adjustment; nitrogen, phosphorous, and potassium fertilization; and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm)depth of soil
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. (100 sq. m) for 6-inch (150-mm)depth of soil

1.12 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

B. Planting-Soil Type - Existing: Existing, on-site surface soil, with the duff layer, if any, retained, and either in place on-site or stockpiled on-site; modified to produce viable planting soil.

1. Test soils prior to construction according to “Preconstruction Testing,” “Soil-Sampling Requirements,” and “Testing Requirements” articles above.

2. Blend existing, on-site surface soil with the following soil amendments and fertilizers, as recommended by soil test reports:

   a. Loose Compost.
   b. Loose Sphagnum Peat.
   c. Loose Wood Derivatives.
   d. Lime.
   e. Sulfur.
   f. Agricultural Gypsum.
   g. Manure.
   h. Superphosphate.
   i. Commercial Fertilizer.
   j. Slow-Release Fertilizer.

3. Provide Planting-Soil classified by the USDA as “sandy loam,” with a pH of 6.0 - 7.5, and organic matter content between 4% and 8% (inclusive) as determined by loss on ignition of moisture-free samples dried at 65 degrees Celsius.

4. Test soils after blending to verify textural, pH and organic metrics are met. Test according to “Preconstruction Testing,” “Soil-Sampling Requirements,” and “Testing Requirements” articles above.

C. Planting-Soil Type - Blended: Existing, on-site subsoil exposed by excavation, modified to produce viable planting soil.

1. Test soils prior to construction according to “Preconstruction Testing,” “Soil-Sampling Requirements,” and “Testing Requirements” articles above.

2. Clean soil of the following:

   a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
   b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
   c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.

3. Blend Loose Compost into existing, on-site subsoil at a ratio of 1:4 by volume. Blended soil shall be friable, and with sufficient structure to give good tilth and aeration.

4. Blend subsoil-compost mixture with the additional following soil amendments and fertilizers, as recommended by soil test reports:

    a. Loose Sphagnum Peat.
    b. Loose Wood Derivatives.
    c. Lime.
    d. Agricultural Gypsum.
    e. Manure.
    f. Superphosphate.
    g. Commercial Fertilizer.
    h. Slow-Release Fertilizer.

5. Provide Planting-Soil classified by the USDA as “sandy loam,” with a pH of 6.0 - 7.5, and organic matter content between 4% and 8% (inclusive) as determined by loss on ignition of moisture-free samples dried at 65 degrees Celsius.

6. Test soils after blending to verify textural, pH and organic metrics are met. Test according to “Preconstruction Testing,” “Soil-Sampling Requirements,” and “Testing Requirements” articles above.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
3. Form: Provide lime in form of ground dolomitic limestone

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

D. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C33/C33M

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Feedstock: May include animal waste and leaves
2. Reaction: pH of 5.5 to 8
3. Soluble-Salt Concentration: Less than 4 dS/m.
4. Moisture Content: 35 to 55 percent by weight.
5. Organic-Matter Content: 30 to 40 percent of dry weight.
6. Particle Size: Minimum of 98 percent passing through a 4-inch (100-mm) sieve.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

C. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 33 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.

2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

2.5 SAND

A. Hard, granular natural, uniformly graded sand, washed free of materials and chemicals deleterious to plant growth

Sieve Size	Percent Passing
3/8”	100
#3	95-100
#8	85-97
#16	60-80
#30	10-20
#50	5-15
#100	0-5

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. 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 planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated planting areas to a minimum depth of 14 inches. Stockpile excavated soil until amended. Do not excavate in protected areas.

1. If it is determined that there is existing, on-site topsoil in the proposed parking area that can be reused for planting soil:
   a. Strip off existing vegetation and dispose of off-site.
   b. Test soil prior to construction according to “Preconstruction Testing,” “Soil-Sampling Requirements,” and “Testing Requirements” articles above.
   c. Excavate to a minimum depth of 14 inches and stockpile soil in one location (do not relocate during construction) in piles not to exceed 6’ in height. Do not drive on piles except with lightweight, tracked or balloon-tire equipment, to avoid compaction and destruction of soil structure.

d. Amend soil as recommended by soil analysis and retest before placing.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

C. Unsuitable Materials: Clean soil of stones, roots, plants, sod, and clay lumps.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil in designated p. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till excavated subgrade at designated planting areas to a minimum depth of 2 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Thoroughly mix compost, and additional amendments as recommended by soil test reports or as required by the contract drawings, with unamended soil and place at designated planting areas in two lifts. Meet finish grades. Do not mix or place if soil or subgrade is frozen, muddy, or excessively wet.

1. If required, mix lime and sulfur with dry soil before mixing fertilizer.

2. If required, mix fertilizer with planting soil no more than seven days before planting.

3. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 and tested in-place except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil in designated turfgrass areas. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in designated turfgrass areas to a minimum depth of 8 inches. Remove stones larger than 2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Apply soil amendments, sand (where applicable) and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.

1. If required, mix lime and sulfur with dry soil before mixing fertilizer.
2. If required, mix fertilizer with planting soil no more than seven days before planting.

D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Provide for depth of soil associated with sod.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. After soils have been blended and placed, perform the following tests :

1. Analysis: According to “Testing Requirements” article above.

2. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D698. Space tests at no less than one for each 1000 sq. ft. (100 sq. m) of in-place soil or part thereof.

C. Soil will be considered defective if it does not pass tests.

D. Prepare test reports.

E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.6 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.7 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

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SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Seeding (native meadow seed mixes).
2. Sodding (turfgrass).
3. Erosion-control material(s).

B. Related Requirements:

1. Section 329113 “Soil Preparation.”

2. Section 329300 "Plants" for trees, shrubs, ground covers, and other plants as well as border edgings and mow strips.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation and drawing designations for planting soils.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Schedule conference to coordinate with Planting Preinstallation Conference, and conduct conference at project site, unless otherwise arranged.

1.5 SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Indication of seeding method and equipment to be used and intended depth of seed cover.

C. Product Data: For each type of product indicated.
   1. Mycorrhizal Fungi Inoculant: Product literature and manufacturer's recommended application rates and practices for native meadow seed mix installations.

D. Certification of Seed: From seed vendor for each seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

   1. Certification of each specified native meadow seed mixture. Include identification of source and name and telephone number of supplier.

E. Product Certificates: For fertilizers, from manufacturer (turfgrass sod only; do not use fertilizer on native meadow seed mix installations).

F. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

G. Schedules: Planting Schedule indicating anticipated seeding and sodding dates; Maintenance Schedule indicating anticipated maintenance activities, hours associated with the activities, and their frequencies.

H. Maintenance Log: Written record of actual maintenance activities performed during the maintenance period including description of activities, dates, list of personnel and products applied.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.

1. Professional Membership: Installer shall be a member in good standing of either the National Association of Landscape Professionals or AmericanHort.
2. Experience: Five years' experience in turf installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the National Association of Landscape Professionals:

    a. Landscape Industry Certified Technician - Exterior.
    b. Landscape Industry Certified Lawn Care Manager.
    c. Landscape Industry Certified Lawn Care Technician.

5. Pesticide Applicator: State licensed, commercial.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

A. Planting Restrictions - Sod: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

B. Planting Restrictions - Seed: Native meadow grasses and wildflowers are warm season grasses and require 70-degree soil temperature to germinate.
   1. Sow from April 1 to July 1.
   2. Dormant seeding from November 1 to December 31 is also acceptable (ground can be frozen).
   3. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of Substantial Completion.

C. Weather Limitations: Proceed with seeding and sodding only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.10 COORDINATION

A. Coordinate Work of the Section with installation of underground utilities, topsoil and plants.

PART 2 - PRODUCTS

2.1 SEED (NATIVE MEADOW SEED MIXES)

A. Native Meadow Seed: Fresh, clean, dry, new-crop seed.

B. Seed Mix: Proprietary seed mixes as follows:

   1. Products: Subject to compliance with requirements, provide the following mixes distributed by Ernst Conservation Seeds, 8884 Mercer Pike, Meadville, PA 16335, ph. (800) 873-3321:

      a. Meadow Mix: Ernst ‘Mesic to Dry Native Pollinator Mix’
      b. Riparian Mix: Ernst ‘Riparian Buffer Mix’
      c. Upland Slope Seed Mix: Ernst ‘Native Steep Slope Mix w/Annual Ryegrass’

C. Cover Crop: Grain Rye Cover Crop as recommended by Ernst Conservation Seeds

2.2 SITE STABILIZATION SEED MIX

A. If the site is prepared at a time that does not allow the sowing of the specified native meadow seed mix within the specified time window, the following seed mix is to be sown:
   1. Avena sativa (seed oats) @ 64 pounds per acre
   2. Lolium multiflorum (annual ryegrass) @ 25 pounds per acre

B. Under no circumstances are the following species to be used:
   1. Winter rye
   2. Winter wheat

2.3 TURFGRASS SOD

A. Turfgrass Sod: Certified complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

A. Turfgrass Species: Sod of grass species as follows, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:

   1. TifTuf™ Bermudagrass

2.4 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

   1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

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. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.5 MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.6 PLANTING SUPPLEMENTS

A. Pesticide(s): Registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

D. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

2.7 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
   1. Product: North American Green DS75 Single Net Straw Blanket

B. Erosion-Control Fiber Mesh: Biodegradable burlap or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

C. Erosion-Control Mats: Cellular, nonbiodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface, of 4-inch nominal mat thickness. Include manufacturer's recommended anchorage system for slope conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area; verify that prepared topsoil is otherwise ready to receive Work of this Section.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Confirm that required utilities are available and ready for use.

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 TURF AREA / NATIVE MEADOW SEED MIX AREA PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 Soil Preparation.

B. 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.

C. Placing Planting Soil: Place manufactured planting soil over exposed subgrade.

1. Reduce elevation of planting soil at sodded areas to allow for soil thickness of sod.

2. Verify that planting soil is lightly compacted and firm. If walking compacts the planting soil more than ½”, planting site shall be Culti-packed.

D. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

E. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.3 PREPARATION OF NATIVE MEADOW SEEDBED

A. Mark edges of areas to be seeded, taking care to ensure areas to be seeded with differing seed mixes are defined in a craftsman-like manner with true geometric boundaries as delineated on the Drawings.

B. Water area to encourage germination of weed seeds near the surface. Most weed seeds will germinate within two weeks of application of moisture. Do not till the soil again as this will bring even more seeds up to the surface.

C. Spray any new weed growth with specified herbicide in accordance with manufacturer's instructions. Provide waiting period for soil to recover, as recommended by manufacturer, prior to seeding.

D. Do not till soil unless otherwise directed. Do not apply fertilizer. Culti-pack soil if it is in a tilled or otherwise un-firm condition.

E. Apply mycorrhizal fungi inoculant prior to sowing of seed. Apply at a rate of one pound per 1000 square feet.

3.4 PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area / Native Meadow Seed Mix Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5 SEEDING (NATIVE MEADOW SEED MIXES)

A. DO NOT APPLY FERTILIZER TO AREAS RECEIVING NATIVE MEADOW SEED MIXES.

B. Apply seed mix with appropriate rangeland seed drill with packing wheels designed for installation of native grass and wildflower seed. Rolling is not necessary if appropriate drill is used with packing wheels. Seeding depth: confirm and follow recommendation of native seed supplier.

C. Protect seeded slopes exceeding 1:6 against erosion with erosion control blanket installed and stapled according to manufacturer's recommendations.

D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.6 SODDING

A. Lay sod within 24 hours of harvesting unless a suitable preservation method is accepted by Architect prior to delivery time. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than two anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

3.7 PLUGGING

A. Plant plugs in holes or furrows, spaced as indicated on the plans (plant schedules shows different spacing per species). On slopes, contour furrows to near level.

3.8 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas 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 (100 mm).

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow bermudagrass to a height of 1/2 to 1 inch.

D. Turf Postfertilization: Apply commercial fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that provides actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.9 NATIVE MEADOW SEED MIX AREA MAINTENANCE

A. Maintain a satisfactory meadow area by weeding, mowing and replanting.

B. Provide a monthly program of weed control. Large weed patches shall be eliminated by either spot-spraying with a general herbicide, or selective cutting with a string trimmer. Apply herbicides in accordance with manufacturers' written instructions. Correct damage resulting from improper use of herbicides.

C. Provide first year mowing as follows:
1. First mowing to be 4-6 inches height when oat sets seed heads.
2. Mow to 4-6 inches height on a monthly interval or whenever weeds reach a height of 10" for remainder of first season.

D. Roll, re-grade, and immediately replant bare or eroded areas and re-mulch to produce a uniformly smooth grade. Provide material and installation the same as those used in the original installation.

1. Repair eroded areas by filling with topsoil, re-grading, and replanting.

E. Provide a log of maintenance activities including dates, hours, equipment used, and personnel involved.

3.10 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.11 SATISFACTORY STAND OF NATIVE MEADOW

A. Installation shall meet the following criteria as determined by Architect during final inspection and at acceptance:
1. Satisfactory Stand of Native Meadow (at the beginning of the second growing season):
   a. A healthy, uniform stand of grasses and wildflowers with 75% of the plant community being covered with the intended plant material.
   b. 50% of the specified species shall be present.
   c. 25% of the plant material shall be the permanent species.
2. Use specified materials to reestablish native meadow stands that do not comply with requirements and continue maintenance until conditions are satisfactory. In areas where native meadow stands require over-seeding to meet specification, over-seeding will be performed using a slit seeder. No other over-seeding method will be acceptable.
3. If satisfactory stand of native meadow has not been established at final inspection, another inspection shall be made upon written Contractor request.

3.12 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf and native meadow work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

3.14 MAINTENANCE SERVICE

A. Turf Maintenance Service: Provide full maintenance by skilled employees of landscape installer. Maintain as required in "Turf Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable turf is established, but for not less than the following period:

1. Sodded Turf: 30 days from date of Substantial Completion.

B. Native Meadow Maintenance Service: Provide full maintenance by skilled employees of landscape installer. Maintain as required in "Native Meadow Seed Mix Area Maintenance" Article. Begin maintenance immediately after each area is planted and continue until acceptable native meadow stand is established, but for not less than the following period:

1. Seeded Native Meadows: 12 months from date of Substantial Completion, including one full growing season.

END OF SECTION 329200

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SECTION 329300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Tree-watering devices.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.

1.3 ALLOWANCES

A. Allowances for plants are specified in Section 012100 "Allowances."

1. Perform planting work under quantity allowances and only as authorized. Authorized work includes work required by Drawings and the Specifications and work authorized in writing by Architect.
2. Notify Architect weekly of extent of work performed that is attributable to quantity allowances.
3. Perform work that exceeds quantity allowances only as authorized by Change Orders.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation.

C. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly

supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

D. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.

E. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than the minimum root spread according to ANSI Z60.1 for type and size of plant required.

F. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.

H. Finish Grade: Elevation of finished surface of planting soil.

I. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

J. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

K. Planting Area: Areas to be planted.

L. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

M. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.

N. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

O. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

P. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Schedule conference for a date not less than 60 days prior to commencement of planting installation, and conduct conference at project site, unless otherwise arranged.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format, min. 150 dpi of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:
1. Organic Mulch: 1-quart volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Slow-Release, Tree-Watering Device: One unit of each size required.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

a. Landscape Industry Certified Technician - Exterior.
b. Landscape Industry Certified Interior.
c. Landscape Industry Certified Horticultural Technician.

5. Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to and including 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Deliver bare-root stock plants within 36 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep

root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

D. 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.

E. Handle planting stock by root ball.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F until planting.

G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.

1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.

H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

I. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods: From date of Substantial Completion

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 10 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease,

pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 10-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood or Pine straw, in various locations as shown on the Contract Drawings.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural (not dyed).

2.4 PLANTING SUPPLEMENTS

A. Pesticide(s): Registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal, by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or compression springs.
4. Guys and Tie Wires: ASTM A641/A641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
6. Guy Cables: Five-strand, 3/16-inch-diameter, galvanized-steel cable, with zinc-coated compression springs, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.
8. Padding: Burlap.

2.6 TREE-WATERING DEVICES

A. Slow-Release Watering Device: Standard product manufactured for drip irrigation of plants and emptying its water contents over an extended time period manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.
1. Color: green

2.7 MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.

B. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

C. Burlap: Non-synthetic, biodegradable.

D. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

E. Steel Edging: Standard commercial-steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes. Subject to compliance with requirements, provide products by one of the following: Colmet; Sure-Loc Edging Corporation; Border Concepts, Inc.; Collier Metal Specialties, Inc.; Russell, J.D. Company (The). Edging size min. 3/16 inch wide by min. 4 inches deep. Stakes min. 12 inches long of tapered steel. Standard tapered ends, corners and splicers. Unpainted raw steel or standard black paint - color/finish by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place manufactured planting soil over exposed subgrade and lightly compact to minimize settling.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

D. Application of Mycorrhizal Fungi: At time directed by Architect, broadcast dry product uniformly over prepared soil at application rate according to manufacturer's written recommendations

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

2. Excavate approximately three times as wide as ball diameter for balled and burlapped or container-grown stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
9. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Backfill Soil: Subsoil, topsoil removed from excavations, and manufacture soil mix may be used as backfill soil unless otherwise indicated. Cross-reference 329113 Soil Preparation.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 to 2 inches above adjacent finish grades.

1. Backfill: For trees, use a 1:1 ratio of excavated soil and specified manufactured soil mix. For shrubs and vines, use planting soil.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

    a. Quantity: Three for each caliper inch of plant

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch above finish grades.

1. Backfill: Planting soil
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

    a. Quantity: Two per plant

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE-SPADE PLANTING

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed

for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.

C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

D. Cut exposed roots cleanly during transplanting operations.

E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

A. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees less than 14 feet high and up to 4 inches in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

B. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.

1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

   a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide compression spring for each guy wire and tighten securely.
   b. For trees more than 6 inches in caliper anchor guys to wood deadmen buried at least 36 inches below grade. Provide compression spring for each guy wire and tighten securely.
   c. Support trees with bands of flexible ties at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
   d. Support trees with guy cable connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
   e. Attach flags to each guy wire, 30 inches above finish grade.
   f. Paint compression springs with luminescent white paint.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing, unless otherwise noted.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 2-inch average thickness, with 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.

3.11 EDGING INSTALLATION

A. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch-deep, shovel-cut edge as indicated on Drawings.

B. Steel Edging: Install per manufacturer’s written instructions to match graphic representation(s) on Drawings, creating true arcs and straight lines as depicted.

C. Mow-Strip Installation:
1. Compact subgrade uniformly beneath mow strip.
2. Apply nonselective, pre-emergent herbicide that inhibits growth of grass and weeds.
3. Install weed-control barrier before mulching, covering area of mow strip, and overlapping and pinning edges of barrier at least 6 inches and according to manufacturer's written instructions.
4. Place indicated thickness of specified mulch, fully covering weed barrier.
5. Rake mulch to a uniform surface level with adjacent finish grades.

3.12 INSTALLING SLOW-RELEASE WATERING DEVICE

A. Provide one device for each tree.

B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.13 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.14 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.15 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are more than 10 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

3.16 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.17 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion

B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion

END OF SECTION 329300

SECTION 330500 - COMMON WORK RESULTS FOR UTILITIES

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. Piping joining materials.
2. Transition fittings.
3. Piped utility demolition.
4. Piping system common requirements.

1.3 DEFINITIONS

A. PE: Polyethylene plastic.

B. PVC: Polyvinyl chloride plastic.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes 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 pipes protected from direct sunlight. Support to prevent sagging and bending.

1.5 COORDINATION

A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

B. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces.

C. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Section 033000 "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness, unless otherwise indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

D. Solder Filler Metals: ASTM B32, lead-free alloys. Include water-flushable flux according to ASTM B813.

E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

F. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

G. Solvent Cements for Joining Plastic Piping:

1. ABS Piping: ASTM D2235.
2. CPVC Piping: ASTM F493.
3. PVC Piping: ASTM D2564. Include primer according to ASTM F656.
4. PVC to ABS Piping Transition: ASTM D3138.

H. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.2 TRANSITION FITTINGS

A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

A. Refer to Section 024119 "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 SCOPE OF WORK

A. The contractor shall furnish all materials, equipment, and labor for excavation, installation, backfilling of water mains and related appurtenances as shown on the plans. The Public Works Department and/or Public Utilities Department shall conduct all City inspections on main extension projects.

B. It shall be the contractor's responsibility to notify the Public Utilities and Public Works Departments at least twenty-four hours in advance of beginning any construction work on any project. The contractor must call the Public Utilities Department at 996-4540 and Public Works at 996-6810 and give the location, project name, individual’s name, company name, start date and indicate if it involves water extensions.

C. Contractor shall contact the Public Works department at 996-6810 by 4:15 PM each day to notify where and what will be done the following day. For any work conducted in Garner, Knightdale, Wendell, Zebulon, Wake Forest, and Rolesville or outside the City of Raleigh Service Area the contractor shall contact the Public Utilities Department at 996-4540 by 4:15 PM to notify where and what will be done the following day. Any work requiring inspector observation outside of the normal workday, Monday-Friday, 7:30 a.m. to 4:15p.m. will be charged to the contractor at the current inspector hourly rate.

D. If a developer, engineer or contractor proceeds with the main installation prior to permit issuance the City may require the work to be reinstalled and the developer, engineer or contractor shall be fully liable for all actions and costs, including prosecution by the City or the State for proceeding with installation prior to issuance of appropriate permit(s).

E. "Field changes" are not considered approved by the Public Utilities Department unless revised plans have been submitted to the Public Utilities Department, reviewed and approved. Therefore, the contractor that proceeds with construction prior to this approval, is at his/her own risk.

F. Contractors working (excavation, boring, or other subsurface breach) around or in the vicinity of existing water lines 12 inches in diameter or larger shall be required to physically spot the existing line to be verified by P.U.D. distribution staff or inspection staff. If other existing lines sizes are in question of conflict the contractor shall be directed by P.U.D. staff of the level of subsurface investigation needed to locate the existing line.

3.3 GENERAL TESTING REQUIREMENTS

A. The City may perform and shall require the contractor to perform, such destructive and nondestructive testing, as it deems necessary in order to inspect the materials and workmanship. These tests shall be in accordance with the procedures established by ASTM and AASHTO. The City shall reserve the right to modify the procedures in testing ditch and backfill compaction to allow a deeper test to be made by using the sand-core method and/or nuclear testing gauges.

3.4 HANDLING AND STORAGE OF MATERIALS

A. The contractor shall be responsible for the shipping and storing of all water materials. The contractor shall replace any material which is damaged or defective.

B. The loading and unloading of all pipe, valves, hydrants, and other accessories shall be in accordance with the manufacturer's recommended practices and shall at all times be performed with care to avoid any damage to the material.

C. The contractor shall locate and provide the necessary storage areas for materials and equipment. If private property is being used for storage areas, then the contractor must have the written consent from the owner. Without this written consent, all material and

equipment shall be stored within the existing rights-of-way and easements of the project. Pipe may not be prestrung along job site; it must be delivered to and removed from job site each day. In extenuating circumstances when the inspector authorizes pipe to remain on the project from one day to the next, the ends of the pipe must be sealed.

D. All materials, once on the job site, shall be stored in accordance with the manufacturer's recommendations.

E. All pipes shall be kept free of dirt and other debris. Any damage relating to the coating of the various materials for water mains shall be repaired in a manner approved by the City.

F. The contractor shall be responsible for safeguarding and protecting all material and equipment stored on the job site. The contractor shall be responsible for the storage of materials in a safe and workmanlike manner to prevent injuries, during and after working hours, until the project is complete.

3.5 BARRICADES, SIGNS AND STREET PROVISIONS

A. Signs, barricades, warning lights, guard rails and flaggers shall be employed as necessary when construction endangers either vehicular or pedestrian traffic. These devices shall remain in place until the traffic may proceed normally again. The contractor shall hold the City harmless for any damages or injuries caused by the construction of water mains.

B. Detours and all traffic control measures shall be set up and maintained by the contractor under the direction of the City of Raleigh Department of Transportation and the North Carolina Department of Transportation. Notice must be given a week in advance of the detour so that necessary notification of the traveling public may be made. The contractor will furnish all barricades, signs, lights and other safety devices to protect his/her construction. The contractor is in no way relieved of liability for providing this protection because others approve the detour.

C. Construction work zone signs and signing procedures shall conform to the MUTCD and supplements and to all applicable federal, state and local codes. The contractor shall be responsible for securing the necessary permits from the City's and the State’s Department of Transportation and Inspections for all work to be performed in the public rights-of-way.

3.6 PROPERTY PROTECTION

A. Trees, fences, poles and all other property shall be protected unless their removal is authorized, and any property not authorized for removal, but damaged by the contractor, shall be restored by the contractor to the owner's satisfaction.

3.7 GENERAL CONSTRUCTION SAFETY

A. The contractor and any subcontractors shall be responsible for the total compliance with all federal, state and local ordinances, laws and regulations as related to safe construction practices and to protecting the employees and the public's health and safety.

B. The contractor shall ensure that all Occupational Safety and Health Administration (OSHA) regulations and standards are followed during all phases of the construction project.

C. The City shall not be responsible for the contractor's adherence to OSHA regulations and standards. However, the City may report known violations or unsafe practices to the appropriate enforcement agency.

D. The contractor shall be required to furnish safety equipment necessary to inspect the work including, but not limited to ladders, gas detectors/oxygen sensors, blowers, etc.

3.8 ENCROACHMENT CONTRACTS AND PERMITS

A. Prior to actual construction, the contractor shall acquire the necessary encroachments from NCDOT when working within the rights-of-way of state system roads or highways. The encroachment permit shall be kept on the job site at all times.

B. The contractor shall be responsible for securing all other local, state and federal permits required for the utility construction.

C. The contractor must have an approved set of permitted construction plans on site at all times.

D. For projects which require construction plan approval, all environmental permits and NCDOT encroachments must be provided prior to plan approval. See general policies and regulations section Page 25.

3.9 EROSION CONTROL

A. Erosion control measures shall be performed by the contractor, conforming to the requirements of, and in accordance with plans approved by the State of North Carolina Department of Environment and Natural Resources, North Carolina Sedimentation Control Commission and City of Raleigh Inspections Department Erosion Control Division, and as per the erosion control plan portion of the construction drawings and these specifications. The contractor shall not allow mud and debris to accumulate in the streets. The sedimentation and erosion control plan and permit shall remain on site at all times. Should the contractor pump water from trenches during construction, appropriate siltation preventative measures shall be taken prior to the entry into any

storm drain or stream. All materials used for erosion control shall be approved by the Engineer prior to installation by the contractor.

a. Temporary and permanent erosion control measures shall be shown on the plans. Temporary and permanent erosion control work shall be coordinated throughout the project to provide effective and continuous erosion control throughout construction and post construction, which minimizes siltation of streams, lakes, reservoirs, other water impoundments, ground surface, or other property. Seeding and mulching shall be carried out immediately behind construction.

b. Temporary erosion control measures shall include but not be limited to swaled easements, silt fences, crushed stone check dam devices, silt basins (sedimentation traps), mulching, earth berms, and rip-rap.

c. Permanent erosion control measures shall include but not be limited to swaled easements, rip-rap, and seeding of disturbed areas.

d. Erosion and siltation shall be controlled on projects by using swales to control run-off and convey run-off to controlled discharge points, by silt fences, rip-rap, crushed stone, and earth berms to contain silt, with pipe culverts where major access or haul roads cross drainage ditches or streams, silt basins where pipe lines cross drainage ditches or streams, and seeding and mulching will be performed as soon after pipe installation as possible. When temporary measures are removed after completion of the project the disturbed area must be stabilized, if necessary.

3.10 ROCK EXCAVATION

A. Rock shall be defined as that solid material that cannot be excavated, in the opinion of the Public Utilities Director or Engineer, by any means other than drilling and blasting, drilling and wedging, or boulders and broken concrete exceeding ½ cubic yard in volume. Rock shall be excavated to the same limits as earth excavation except that the trench shall be made 6- inches lower than the outer bottom of the pipe. This 6-inches shall be refilled with 6-inches of #67 stone and thoroughly compacted to the sub-grade level. All blasting shall be done under the supervision of the City Inspector or Engineer and subject to all applicable regulations. The City reserves the right to require the removal of rock by means other than blasting where any pipe or conduit is either too close to or so situated with respect to the blasting as to make blasting hazardous. Rock taken from the ditch shall immediately be hauled away and disposed of by the contractor.

B. Blasting procedures shall conform to all applicable local, state and federal laws and ordinances. A blasting permit shall be obtained from the City of Raleigh Fire Marshal's Office, prior to any blasting. The application shall be obtained 24-hours before any blasting takes place, and the Fire Marshal may specify the hours of blasting. The contractor shall take all necessary precautions to protect life and property, including the

use of an approved blasting mat where there exists the danger of throwing rock or over- burden. The contractor shall keep explosive materials that are on the job site in special constructed boxes provided with locks. Failure to comply with this specification shall be grounds for suspension of blasting operations until full compliance is made. No blasting shall be allowed unless a galvanometer is employed to check cap circuits. Where blasting takes place within five-hundred feet of a utility, structure or property which could be damaged by vibration, concussion or falling rock, the contractor shall be required to take seismograph readings and to keep a blasting log containing the following information for each and every shot.

1. Date of shot
2. Time of shot
3. Crew Supervisor
4. Number and depth of holes
5. Approximate depth of overburden
6. Amount and type of explosive used in each hole
7. Type of caps used (instant or delay)
8. The weather
9. Seismograph instrument and readings

C. This blasting log shall be made available to the Public Utilities Director or Engineer upon request and shall be kept in an orderly manner. It shall be the contractor's responsibility to have adequate insurance to cover any damages resulting from blasting so to hold the City of Raleigh harmless from any claims.

3.11 PAVEMENT REMOVAL AND REPLACEMENT

A. All pavements to be removed shall be cut along straight lines with the appropriate saw cut machine. The removal and replacement of the pavement shall conform to the information shown in Details W-1 & W-2.

B. All cuts of Public streets must be patched the same day with a temporary or permanent patch. Once work has been completed, all temporary patches shall be replaced with permanent ones. All work from patching shall be cleaned up at the same time of patching.

C. Pavement cuts shall be confined to a maximum trench bottom width as shown in Details W-1 thru W-3, plus 12 inches on either side.

D. Asphalt compaction shall be done with a gasoline or diesel powered smooth drum asphaltic roller.

E. Pavement cuts within NCDOT Right of Way shall not be performed without the proper encroachment permits on site. All patching of NCDOT pavements shall conform to the approved on site encroachment permit.

3.12 SURFACE RESTORATION

A. All disturbed surfaces and property thereon, shall be restored to a condition equal to that existing before construction began, and the contractor shall maintain and be responsible for all ditches in paved streets, curbs, gutters or sidewalks until the contractor repaves the trench cuts. The contractor, with permission of the inspector, may place temporary or permanent asphaltic material in the cut. Asphalt compaction shall be done with a gasoline or diesel-powered smooth drum asphaltic roller.

B. All easements will be seeded with grass and left so they can be mowed by conventional mowers, unless approved by the Public Utilities Department for rip-rap or other specified material. In remote areas, easements will be seeded with a quality fescue grass. In residential areas, easements will be seeded with either falcon or rebel fescue or leaf mulch at the request of property owner. The contractor shall guarantee a good uniform stand of grass and shall reseed any bare or thin spots. The contractor will be responsible for a one- year warranty on materials and workmanship.

3.13 GUARANTEE

A. The contractor shall guarantee all material, equipment, and workmanship for a period of at least one-year after final acceptance by the City. The Public Works Department Construction Inspection Division is responsible for the issuance of final acceptance letters by the City.

B. For projects in Merger Areas the Public Utilities Department Construction Inspection Division is responsible for issuance of final acceptance letters.

3.14 WETLAND/STREAM BUFFERS

A. Conditions of 401/404 permits shall be strictly followed to the satisfaction of Corps of Engineers. All Neuse Riparian buffers shall be maintained as required by the North Carolina Division of Water Quality.

3.15 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

G. Grooved Joints: Assemble joints with grooved-end pipe coupling with coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.

H. Soldered Joints: Apply ASTM B813 water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B32.

I. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

J. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.

K. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D2235 and ASTM D2661 appendixes.
3. CPVC Piping: Join according to ASTM D2846/D2846M Appendix.
4. PVC Pressure Piping: Join schedule number ASTM D1785, PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.
5. PVC Nonpressure Piping: Join according to ASTM D2855.
6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D3138 Appendix.

L. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D3139.

M. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D3212.

N. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D2657.

1. Plain-End PE Pipe and Fittings: Use butt fusion.
2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.

O. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.16 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Install dielectric fittings at connections of dissimilar metal pipes.

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SECTION 331415 – SITE WATER DISTRIBUTION PIPING

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.

PART 2 - PRODUCTS

A. Water Mains

1. All water mains shall be pressure class or thickness class ductile iron pipe designed in accordance with AWWA Standard C-150. Design shall be done for external and internal pressures separately, using the larger of the two for the next design thickness. An additional allowance shall be made for corrosion and casting tolerances. The thickness design for external and internal pressures shall use the following conditions:
   a. 3 feet minimum cover or as shown on the plans;
   b. Laying condition - Type 1;
   c. A minimum working pressure of 150 psi for pipes 16 inches and smaller in diameter, and for 24 inches and larger pipe, the design working pressure shall be as determined by the Public Utilities Director, and
   d. A surge pressure of 300 psi.

2. All calculations for thickness shall be in accordance with AWWA Standard C-150, and the calculations shall be submitted to the Fayetteville's Public Works Commission's Water Distribution Division for approval prior to shipping any pipe. The minimum thickness shall be pressure class 350 for pipes 6 inches through 12 inches and pressure class 250 for pipes 16 inches and larger in diameter.

3. The ductile iron pipe shall be manufactured in accordance with all applicable requirements of AWWA Standard C-151. The ductile iron pipe shall be supplied in nominal lengths of 18 or 20 feet.

4. The ductile iron pipe shall be cement-mortar lined with a sealcoat in accordance with AWWA Standard C-104. Ductile iron pipe shall be externally bituminous coated in accordance with AWWA C-151.

5. Pipe joints shall be mechanical or "push-on" manufactured in accordance with AWWA Standard C-111.

6. Each joint of ductile iron pipe shall be hydrostatically tested before the outside coating and inside lining are applied at the point of manufacture to 500 psi. Testing may be performed prior to machining bell and spigot. Failure of ductile iron pipe shall be defined as any rupture or leakage of the pipe wall.

7. All materials used in the production of the pipe are to be tested in accordance with AWWA Standard C-151 for their adequacy within the design of the pipe, and certified test results are to be provided to the City upon request. All certified tests, hydrostatic and material are to be performed by an independent testing laboratory at the expense of the pipe manufacturer.

8. Push-on and mechanical joint pipe shall be as manufactured by the American Cast Iron Pipe Company, United States Pipe and Foundry Company, Griffin Pipe Products Company, McWane Cast Iron Pipe Company or approved equal.

9. Restrained joints shall be TR Flex or HP LOK as manufactured by U.S. Pipe, Lok-Ring or Flex-Ring as manufactured by American Pipe, Super-Lock as manufactured by Clow, Bolt-Lok or Snap-Lok as manufactured by Griffin or approved equal.

B. Fittings

1. All fittings shall be manufactured in accordance with AWWA C-110 or C-153 for ductile iron compact fittings. The fittings shall be tested, and the manufacturer shall provide certified test results when requested by the City. This testing shall include hydrostatic proof testing of the fittings.

2. All fittings shall be mechanical joint with the exception of certain above ground piping which may require flange fittings. Mechanical joints shall be manufactured in accordance with AWWA Standard C-111.

3. All fittings shall be cast iron or ductile iron and shall have a minimum working pressure rating of 250 psi and minimum iron strength of 30,000 psi.

4. All fitting interiors shall be cement-mortar lined with a sealcoat in accordance with AWWA Standard C-104, and the outside shall be bituminous coated.

5. Restrained mechanical glands may be used where restraint is needed except when welded restraining rings are required. Restrained mechanical glands provide additional restraint, but do not take the place of required concrete blocking.

6. 45° and 90° bends shall be allowed in the water distribution system for all line sizes when required.

C. Gate Valves

1. Cast iron or ductile iron resilient wedge style vertical or horizontal gate valves and tapping valves shall be used for all main line and hydrant branch valves in sizes from 6 inches through 24 inches. American, Mueller, Kennedy, AVK, Clow, M&H, and Waterous valves in accordance with AWWA C-509-94, C-515, or the appropriate AWWA standard as applicable, shall be used. All resilient wedge valves shall have internal and external epoxy coating, O-ring seals at the stuffing box and bonnet to body and dual O-rings at the stem seal above the thrust collar.

2. Tapping valves shall be the same valves as gate valves listed above, subject to the standards, providing that tapping valve shall have the tapping ring.

3. Gate valves twelve (12) inches in diameter and smaller, shall be mechanical joint or hub- end all-bell. They shall be "O" ring, open-left valves of the non-rising stem type. These valves shall be designed for a minimum of 175 psi working pressure and 300 psi hydrostatic test pressure with a two (2) inch operating nut. Valves shall be cast iron or ductile iron.

4. Valves sixteen (16) inches in diameter or greater may be the horizontal gate type or butterfly type, as specified on construction plans, or gate valves as specified above.

5. Gate valves, horizontal gate valves or butterfly valves shall be used for all main line and hydrant branch valves in sizes 16 inches through 24 inches.

D. Valve Boxes

1. Adjustable valve boxes shall be class 35 gray cast iron and manufactured in accordance with ASTM A48 and be of the dimensions specified in Detail W-17 of these specifications. Lids shall have the word "Water" cast into the lid. See Detail W-18. All castings must be domestically cast and so indicated by the manufacturers name and “USA” cast into all sections of the valve box. All castings must meet or exceed AASHTO H-20 load rating. Total valve box weight shall be a minimum of 85 lbs and have a minimum lid weight of 25 lbs. Mueller Model AJBV 5 adjustable are permissible.

E. Butterfly Valves – Not Used

F. Fire Hydrants

1. Fire hydrants shall comply with AWWA C-502-94 as manufactured for the City of Fayetteville by Kennedy, Mueller, Clow, American Darling.

2. City of Fayetteville fire hydrant nozzles shall have National Standard Threads.

3. The City of Fayetteville may require fire hydrants to resist accidental and deliberate contaminations of the water supply.

4. All fire hydrants shall have 2-two-and one-half inch nozzles, and 1- 5" Storz connection nozzle. The nozzle shall be an integral part of the fire hydrant and must be furnished by the manufacturer or authorized distributor designated by the manufacturer. Storz connector shall have the following characteristics: brass hydrant nozzle connection; have hard anodized aluminum Storz ramps and lugs (hydrant and cap side); and require a high- torque Storz spanner wrench in order for the cap to be removed.

5. See drawings for hydrant information pertaining to each town.

6. The hydrant valve opening shall be five and one-quarter inches with no exceptions. Bronze to bronze threads shall be provided between the hydrant seat or seat ring and the seating attaching assembly. All hydrants must include cast or ductile epoxy lined shoe, rubber drain seals and positive, protective valve stop device.

7. Hydrants shall be open-left type and shall have a six-inch hub-end or mechanical joint elbow. The hydrant barrel shall be of sufficient length to provide a minimum of three and one-half feet of bury and be of the break-away impact type.

8. Fire Hydrant Colors

9. City of Fayetteville public fire hydrants shall be painted safety yellow with high reflective aluminum silver caps, bonnets, and operating nuts.

10. Operating nuts on hydrants connected to public mains of any other size shall be painted silver.

G. Air Release Valves – Not Used

H. Tapping Sleeves and Tapping Saddles

1. Tapping sleeves shall be Mueller mechanical joint, Mueller Outlet Seal, American Uniseal, Kennedy Square Seal, or Clow F5205 or F5207. 100% stainless steel sleeves may also be used, as manufactured by Smith-Blair, Romac, Ford, or JCM provided that all metallic parts of the sleeves shall be 100% stainless steel including bolts. Ductile iron flanges may be included on sleeves or saddles. Test assembly seals with water according to AWWA C-223. All sleeves shall have a minimum of 150 psi working pressure. All taps shall be machine drilled--no burned taps will be allowed.

2. Tapping saddles may be used on mains 16-inches and larger. In 16- and 24-inch saddles as manufactured by Meuller, American, Kennedy and Clow tapping saddles shall be manufactured of ductile iron providing a factor of safety of 2.5 at a working pressure of 250 psi. In main sizes of 30-inch and larger, ductile iron tapping saddles as manufactured by American Pipe Company or US Pipe Company shall be utilized.

3. Saddles shall be equipped with a standard AWWA C-110-98 flange connection. Sealing gaskets shall be "O" ring type, high quality molded rubber having an approximate seventy durometer hardness, placed into a groove on the curved surface of the tapping saddle. Straps shall be of alloy steel. Saddles may be used for taps one-half the size of the main or less (i.e. 8-inch tapping saddle for use on a 16-inch main).

I. Meters

1. All water meters shall be provided and installed by the City of Fayetteville Fayetteville's Public Works Commission's Water Distribution DivisionMeters Division.

J. Meter Boxes and Vaults

1. All meter boxes and vaults shall be constructed of cast iron, precast concrete, concrete block, high-density polyethylene, or cast-in-place concrete as on applicable details W-23 thru W-35. Meter vault access doors shall be aluminum slam lock type as manufactured by Halliday, U.S.F. Fabrication, or approved equal.

2. Meter boxes and vaults shall not be placed within sidewalks or driveways unless no other alternatives are available, and approval is obtained by the Public Utilities Director. Traffic rated lids and vaults shall be installed for all meters 1 ½" and larger.

3. The meter box must be set to grade. If for some reason, the grade is altered, then the meter box must be adjusted to match the new grade. This includes the addition of topsoil by a landscape contractor or homeowner, flower gardens, etc.

K. Steel Encasement Pipe

1. Steel pipe for boring installations shall be high strength steel, welded or smooth-wall seamless manufactured in accordance with ASTM A252 and consisting of grade 2 steel with a minimum yield strength of 35,000 psi. The minimum casing pipe wall thickness shall be 0.375" for bored encasement.

2. No coatings required for buried or bored encasements but must conform to the noted wall thickness in the table below. All encasement pipe must be approved by the appropriate controlling agency (i.e. NCDOT, RR, etc.) prior to ordering the material.

3. All carrier piping shall be restrained joint ductile iron. One joint of restrained pipe must extend beyond the ends of the encasement pipe. The minimum inside diameter of steel encasements shall be eight inches greater than the inside dimension of the carrier pipe. See the following table for encasement diameter and thickness:

Carrier Pipe Nominal Diameter (inches)	Encasement Minimum Inside Diameter (inches)	Encasement Nominal Wall Thickness (inches)
6	14	0.375
8	16	0.375
10	18	0.375
12	20	0.375
14	24	0.375
16	26	0.500
18	30	0.500
20	32	0.500
24	36	0.625
30	42	0.625
36	48	0.750
42	56	0.875

4. Both ends of the casing shall be mortared. Metal "spider" pipe alignment devices shall be installed in all casings with a minimum of two “spiders” per pipe joint one fourth of the pipe joint length in from both the bell and spigot ends. See Detail W-40.

PART 3 - EXECUTION

A. The requirements contained in this section shall apply to water main installations constructed for the or for private developers who may or may not dedicate the water improvements to the City. All necessary construction permits must be obtained before construction may begin in accordance with North Carolina State Law.

B. Any Contractor performing work within the City of Fayetteville, shall have on each job site a copy of these specifications.

3.1 SCOPE OF WORK

A. The contractor shall furnish all materials, equipment, and labor for excavation, installation, backfilling of water mains and related appurtenances as shown on the plans. The Public Works Department and/or Fayetteville's Public Works Commission's Water Distribution Divisionshall conduct all City inspections on main extension projects.

B. It shall be the contractor's responsibility to notify the Public Utilities and Public Works Departments at least twenty-four hours in advance of beginning any construction work on any project. The contractor must call the Fayetteville's Public Works Commission's Water Distribution Divisionat 996-4540 and Public Works at 996-6810 and give the location, project name, individual's name, company name, start date and indicate if it involves water extensions.

C. Contractor shall contact the Public Works department at 996-6810 by 4:15 PM each day to notify where and what will be done the following day. For any work conducted in Garner, Knightdale, Wendell, Zebulon, Wake Forest, and Rolesville or outside the City of Fayetteville Service Area the contractor shall contact the Fayetteville's Public Works Commission's Water Distribution Divisionat 996-4540 by 4:15 PM to notify where and what will be done the following day. Any work requiring inspector observation outside of the normal workday, Monday-Friday, 7:30 a.m. to 4:15p.m. will be charged to the contractor at the current inspector hourly rate.

D. If a developer, engineer or contractor proceeds with the main installation prior to permit issuance the City may require the work to be reinstalled and the developer, engineer or contractor shall be fully liable for all actions and costs, including prosecution by the City or the State for proceeding with installation prior to issuance of appropriate permit(s).

E. "Field changes" are not considered approved by the Fayetteville's Public Works Commission's Water Distribution Divisionunless revised plans have been submitted to the Public Utilities Department, reviewed and approved. Therefore, the contractor that proceeds with construction prior to this approval, is at his/her own risk.

F. Contractors working (excavation, boring, or other subsurface breach) around or in the vicinity of existing water lines 12 inches in diameter or larger shall be required to physically spot the existing line to be verified by P.U.D. distribution staff or inspection staff. If other existing lines sizes are in question of conflict the contractor shall be directed by P.U.D. staff of the level of subsurface investigation needed to locate the existing line.

3.2 VALVE OPERATIONS

A. No valve in the existing system shall be operated without following the procedure outlined below. Failure to comply with these requirements shall be grounds for suspension of pipe- laying operations until written assurance can be obtained from a

company official that such noncompliance will not occur again. The contractor should be aware that the City regards violations of these requirements as justifying punitive measures.

B. Notification procedures are as follows:

1. The contractor shall notify Fayetteville's Public Works Commission's Water Distribution Division at (910) 223-4730 to request the operation of any valves. At least twenty- four hours' notice must be given to the Public Works Commission, and at least twenty- four hours' notice must be given to each customer affected by a water cut-off. The contractor is responsible for notifying the affected customers. All valve operations shall be done by Public Works Commission or by the City's inspector for a particular project. It is illegal for anyone other than a City of Fayetteville employee to operate an existing water main valve, unless accompanied by a City of Fayetteville employee.

2. The contractor shall provide the following information when calling the Public Works Commission for valve operation:

a. Name of person calling;
b. Name of company;
c. Telephone number of company;
d. Location of valve and map number if available;
e. Reason for requesting operating and whether to be closed or open;
f. Time valve to be opened or closed, and
g. Approximate time water line to be out of service.

C. Each time a contractor needs a valve operated, he/she shall again secure permission, following the steps outlined.

D. System valves shall be defined as any valve, which has main pressure against either gate face. Newly installed tapping valves and control valves to networks not yet accepted for service are considered as system valves and should only be operated under guidance of City of Fayetteville Inspectors Valves within a network still under construction are not considered as system valves.

E. All newly installed system valves that connect to the active distribution system shall have a valve box cover painted "red" in color and installed on the corresponding valve box to signify that the valve and main are not in service. The "red" valve box cover shall remain in place until the new main is placed into service, when at such time it shall be replaced with a cover as shown on detail W-18.

3.3 TRENCH EXCAVATION

A. Prior to any excavation or construction, the contractor shall locate all existing utilities in the field. If help is needed in locating utilities operated by the Public Works Commission, the contractor should contact the Fayetteville's Public Works Commission's Water Distribution Division (910) 223-4730.

B. Trench width shall be a minimum of twelve inches plus outside diameter of pipe and a maximum of twenty-four inches plus outside diameter of pipe, unless OSHA requires additional trench width. Trench width shall be measured between the faces of the cut at the top elevation of the pipe bell as shown in Detail W-3.

C. Trench bottom conformation, where no special bedding is required, may be that referred to herein as flat bottom where the trench bottom is excavated slightly above grade and cut down to pipe grade by hand in the fine-grading operation. Where the trench bottom is inadvertently cut below grade, it shall be filled to grade with an approved material and thoroughly compacted to 95% or use #67 stone to bring to grade.

D. The maximum length of open trench shall be no more than three hundred feet, unless approval is obtained from the Public Utilities Director.

E. The contractor shall, at his/her own expense, keep all trenches free from water during the excavation for construction of foundations, masonry, water mains. The water shall be pumped out of the trench or check dams shall be built to keep it out of the ditch in such a manner as not to cause injury to the public health, private property or the work in progress. Erosion control measures shall be utilized during this pumping.

F. In trenches where water is present or dewatering is required, the trench shall be stabilized with #67 stone. When the contractor encounters material during trench excavation, at the opinion of the inspector, or Public Utilities Director, that is unsuitable (i.e. "muck"), this material shall be replaced with material that is considered suitable prior to the pipe laying operations. In this case, construction fabrics may be required to prevent the migration of side support away from the pipe.

G. Safety and convenience of the public necessitate that all work, including excavation, be done in such a manner as to cause minimum traffic interruption, both pedestrian and vehicular. Utilities such as fire hydrants, valves, etc., shall be accessible at all times. Gutters and drains shall be left open and clear at all times, and the contractor shall be responsible for all drainage around his work. Unless specifically waived by the Public Works Department, provisions shall be made to maintain vehicular traffic on all streets in which work is in progress, and suitable walkways shall be maintained for pedestrian travel.

H. Sheeting or bracing shall be used wherever necessary to prevent failure of the trench banks. All sheeting shall conform to AASHTO and OSHA safety standards. The decision of the Public Utilities Director or Engineer relative to bracing for the protection of property of the City shall be binding upon the contractor. The removal of sheeting shall be done in such a manner as to minimize the loss of friction between the backfill and trench walls.

3.4 TRENCH PREPARATION

A. Trench excavation shall conform to the line and depth shown on the plans. The trench shall be properly braced and drained so that workers may work therein safely and efficiently. When water is being pumped from the trench, the pump discharge shall follow natural drainage channels, drains or storm sewers. In discharging trench water, it will be necessary to follow standard erosion control measures so as to minimize erosion and sedimentation. In no case may trench water or groundwater be pumped into or allowed to enter the sanitary sewer system.

B. The width of the trench may vary with the depth of cut and other conditions the trench shall be in accordance with the dimensions set forth by OSHA and other information shown on the drawings.

C. The foundations for ductile iron shall be a firm and stable flat bottom (Type 1) trench with bell holes so that the pipe rests uniformly on the entire barrel length.

D. Pipe clearance in rock shall be a minimum of six inches below and on each side of the pipe for sized sixteen inches and less in diameter. For sizes larger than sixteen inches in diameter, the minimum clearance shall be nine inches below and on each side.

3.5 PIPE INSTALLATION

A. Ductile iron pipe shall be installed in accordance with the requirements of AWWA Standard C-600.

B. Water pipe shall be laid to the line and grade shown on the plans with all valves and hydrants located as shown on the plans.

C. Protection shall be afforded to all underground and surface structures using methods acceptable to the Public Utilities Director or Engineer. This protection shall be furnished by the contractor at the contractors' own expense.

D. Deviation from line and grade may be made only on revised plans upon approval by Fayetteville’s Public Works Commission’s Water Distribution Divisionand identified on “as builts” when such deviations arise from grade or line conflicts with existing utilities, structures or other sources of conflict.

E. Subsurface explorations shall be made by the contractor at the direction of the Public Utilities Director or Engineer where it is necessary to determine the location of existing pipes, valves or other underground structures.

F. Depth of pipe cover, unless shown otherwise on the plans shall be three feet above top of pipe. Depth of cover shall be measured from the established street grade or the surface of the permanent improvement to the top of the barrel of the pipe. If minimum

cover cannot be maintained due to other agency/development infrastructure projects existing water lines shall be relocated or protected with casings or concrete. In no case shall sub grade construction excavations come within less than 2 feet of the existing pipe crown.

G. After the foundation has been properly graded, bedded when applicable, and the bell holes dug, the pipe and accessories shall be carefully lowered into the trench by approved methods. Under no circumstances shall the pipe or accessories be dropped or dumped into the trench. All damaged pipe and accessories shall be removed from the job.

H. Pipe interior shall be swabbed clean with sodium hypochlorite solution before it is laid, and any pipe which cannot be cleaned with a swab shall be removed and cleaned with suitable apparatus. Any pipe showing evidence of oil, tar or grease shall be permanently marked and removed from the job.

I. Laying of pipe and jointing of pipe shall be done according to manufacturer's recommendation with care being taken to provide uniform bearing for the pipe. Bell and spigot of pipe shall be cleaned and properly lubricated where a mechanical joint of a "push on" type joint is employed. No chlorine powder or tablets shall be put in the lines during installation.

J. Open ends of pipe shall be plugged with a standard plug or cap at all times when pipe laying is not in progress. Trench water shall not be permitted to enter pipe.

K. Pipe cutting for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner in accordance with the manufacturer's recommendations and without damage to the pipe.

L. Bell ends will face the direction of laying unless otherwise directed by the Public Utilities Director or Engineer. For lines on an appreciable slope, the Public Utilities Director or Engineer may also require that bell ends face upgrade.

M. Maximum horizontal deflections for ductile iron pipe shall be as follows for an eighteen-foot joint of pipe:

Maximum Deflection in Inches		
Pipe Size	Mech. Joint	Push-on-joint
6	27	19
8	20	19
10	20	19
12	20	19
14	13	11
16	13	11
18	11	11
20	11	11

24	9	11
30	9	11
36	8	11
42	7	7
48	7	7

N. When installing water &/or sewer mains, the horizontal separation between utilities shall be 10'. If this separation cannot be maintained due to existing conditions, the variation allowed is the water main in a separate trench with the elevation of the water main at least 18" above the top of the sewer & must be approved by the Public Utilities Director. All distances are measured from outside diameter to outside diameter

1. Where it is impossible to obtain proper separation, or anytime a sanitary sewer passes over a water main, DIP materials or steel encasement extended 10' on each side of crossing must be specified & installed to waterline specifications

2. Maintain 18" min. vertical separation at all water main & RCP storm drain crossings; Where adequate separations cannot be achieved, specify DIP materials & a concrete cradle having 6" min. clearance (per CORPUD detail 41)

3. All other underground utilities shall cross water & sewer facilities with 18" min. vertical separation required

O. Maintain 18" min. vertical separation at all water main & storm drain crossings. Where adequate separations cannot be achieved, specify DIP materials & a concrete cradle having 6" min. clearance.

P. All other underground utilities shall cross water & sewer facilities with 18" min. vertical separation required

Q. Railroad crossings shall be made following all precautionary construction measures required by the railroad officials.

R. All water crossings under the state system roads shall be made in accordance with the requirements of the NCDOT as defined in their encroachment permits.

S. Where conditions are, in the opinion of the City Inspector unsuitable for laying pipe because of weather or trench conditions, the contractor shall be required to cease work until permission is given by the City Inspector for work to commence again providing such conditions have been corrected.

3.6 REACTION BLOCKING

A. All fittings or components subject to hydrostatic thrust shall be securely anchored by the use of concrete thrust blocks poured in place, unless otherwise directed by the engineer. The reaction areas required for these thrust blocks shall be given to the

contractor by the inspector, and the contractor shall install the blocks according to directions provided by the inspector. Where concrete must be reinforced, the contractor shall furnish such reinforcing as is required.

B. Required reaction bearing areas will be taken from the schedule herein. Areas given are vertical plans measured in solid material normal to the thrust line of the fitting.

C. Material for reaction blocking shall be transit-mixed concrete. This concrete shall have a twenty-eight-day compressive strength of 3000 psi. Any metal used to resist thrust which is not encased in concrete shall be “hot dipped” galvanized.

D. Valves on ductile iron lines shall be anchored with thrust collars as shown in Details W-7 thru W-9.

3.7 BACKFILLING PIPE

A. The backfilling of the trench after the pipe installation and testing shall be in accordance with Details W-3 for ductile iron.

B. Ductile iron pipe shall be backfilled with suitable native material. No rocks, boulders or stone four inches or larger shall be included in the backfill for at least two feet above the top of the pipe.

C. All backfill shall be compacted in six-inch lifts measured from the pipe foundation upward. Backfill for roadway shall be compacted to at least 95% of maximum soil density in those areas where the supporting capacity of the soil is of prime consideration. Laboratory determination of maximum soil density will follow the procedure of AASHTO T99-86. Field determination of the density of the soil in place shall follow the procedure of AASHTO T191-86 or T204-86. The result of any one test may be a minimum of 90% of maximum density, but the average of any three tests in an area shall be 95% of maximum density. All tests shall be conducted at the direction of the City Inspector, and the cost of such tests will be borne by the contractor with the provision that the City will test an area two times only where both tests fail. The contractor shall then be required to submit satisfactory evidence that his ditch compaction meets the specifications.

D. Deficiency of backfill material shall be supplied by the contractor where this deficiency results from any cause other than rejection of unsuitable backfill material (other than rock) by the City Inspector. In cases where the City Inspector directs, the contractor shall dispose of unsuitable backfill material and provide suitable backfill material.

E. Where excavated material has been rendered unsuitable, either before or after excavation, by inclement weather or type of material, the contractor must correct the moisture or furnish replacement backfill material.

F. Backfilling shall not be allowed, except with permission of the City Inspector. When a ditch is flooded or the weather is unsuitable, the contractor shall not backfill unless

permission is given by the City Inspector. No backfilling with frozen material shall be allowed.

3.8 SETTING VALVES AND VALVE BOXES

A. Valves shall be set at locations shown on the plans with care being taken to support the valve properly and to accurately position the valve box over the operating nut of the valve. Where pavement exists, the box shall be adjusted to finished street grade and a concrete pad two-feet square and six inches thick shall be poured around the box two inches from the top of finished grade as shown in Detail W-17. When valves are located in street rights-of-way, but out of pavement, the boxes shall be adjusted to finished grade and a concrete pad two-feet square and six-inches thick shall be poured around the box one-half inch from the top. When valves are located outside of street rights-of-way, the boxes shall be at finish grade, and a concrete block two-feet square and six-inches thick shall be poured around the box at grade line. Valve locations out of street rights-of-way shall be marked with a metal post having a minimum diameter of two inches and a minimum bury of three feet with a minimum of three feet exposed. The exposed portion shall be painted bright orange and shall be placed so that a valve operating tool has free operation.

B. When a tapping sleeve and valve are being used, the valve, sleeve and machine assembly shall be air tested to hold at 150 psi for a five-minute duration in the presence of the inspector prior to drilling or tapping the main. All tap coupons shall be given to the city inspector. The valve shall be in the closed position during the testing.

C. Reverse taps are not permitted unless approved by the Public Utilities Director. They must have sufficient cover and be marked with a 4-inch PVC marker at the tapping valve identified with an “R” designation.

3.9 SETTING FITTINGS

A. Fittings shall be set at locations shown on the plans with care being taken to properly "bell-up" joints and support the body of the fitting. All dead-end lines shall be plugged with mechanical joint plugs or caps and anchored by using thrust collars and blocking as shown on the drawings.

3.10 SETTING HYDRANTS

A. Specific directions are required for the setting of all hydrants. In streets where paving is proposed in the near future, the contractor will be given line and grade stakes for hydrants. It is mandatory for the contractor to preserve these stakes for the inspector to verify that the hydrant was set correctly. In areas where paving is not anticipated in the near future, hydrants shall be set according to the inspector's directions. When fire hydrants are installed behind guard rails breakaway flanges shall be installed at the ground level and flush with the top of the guard rail. In these installations where

multiple barrel extensions are required the fire hydrant stems shall be a single one-piece unit. In general, hydrants shall be located in a manner to provide complete accessibility and minimize possibility of damage from vehicles or injury to pedestrians.

B. Hydrant installation shall be as shown on the drawings and shall be restrained from the main to the hydrant with a mechanical joint pipe restraining system. If the distance is greater than 20 feet, the hydrant branch shall be restrained for the entire length with a mechanical joint pipe restraining system. When hydrants are used as blow-off assemblies, the valves shall be rodded to a thrust block. Restraining rods and accessories shall be “hot dipped” galvanized.

C. Before a hydrant is set, all dirt and foreign matter shall be removed from the interior of the hydrant.

D. Hydrants shall be bagged to indicate “out of service” until all testing is complete, and the mains are placed in service. Bags shall be large enough to cover the entire hydrant and shall be black in color. Bags shall be secured with duct tape at the base of the hydrant and shall be removed immediately after the hydrants are placed in service.

3.11 SETTING BLOW-OFFS AND RELEASE VALVES

A. Blow-offs and drainage branches shall not be connected to any sewer, submerged in any stream, or be installed in any other manner that will permit back siphonage into the distribution system.

B. All air release valves, and blow-offs shall be installed per drawings. Air release valves must be such that provisions can be made by the contractor to get the flow of water to a natural drainage way.

3.12 MAINTAINING SERVICE

A. When replacing or extending water mains the contractor shall maintain continuous water service to all existing residences and businesses.

3.13 GENERAL WATER MAIN TESTING SEQUENCE

A. Water mains shall be tested in the following general sequence:

1. "Pigging" main (mains with gate valves)

2. Flush the main (all flush water shall be de-chlorinated using methods acceptable to the Fayetteville’s Public Works Commission's Water Distribution);

3. Perform the hydrostatic tests;

4. Introduce the appropriate amount of chlorine by tapping the main;

5. Hold the chlorine solution in the main for at least twenty-four hours and no more than seventy-two hours;

6. Flush the main (all flush water shall be de-chlorinated using methods acceptable to the Fayetteville's Public Works Commission's Water Distribution Division);

7. Sample for the bacteriological tests; and

8. Water mains shall be placed into service within 48 hours of meeting bacteriological analysis requirements. If no activity is anticipated on a water main for the first 30 days after it is placed into service, the contractor shall notify the Fayetteville's Public Works Commission's Water Distribution Division at (910) 223-4730 and provide the location and permit number.

3.14 PIGGING

A. All new mains with gate valves must be pigged with a polyethylene "pig", 5#/cubic foot density at the conclusion of installation.

B. The pig must be blown at the end of the main by means of the following:

1. 4" main - 4" blow-off (private only)

2. 6" main - fire hydrant or 6" blow-off

3. 8" and 12" through blow-off assembly as on Details W-21 & W-22

4. 16" – 24" As determined by the field inspector

The contractor installing the line shall write the name of the company and street name in which the work is taking place on the pig in a manner in which it will not rub off.

3.15 HYDROSTATIC TESTS

A. All main installations including private distribution and fire lines to the buildings shall be pressure tested between each main line valve in accordance with AWWA C-600. The test shall be performed using a suitable pump and an accurate pressure gauge. Immediately upon completion of a section of main, 150 psi (± 5 psi) of pressure shall be applied and held for two hours. Fire lines shall be tested at 200 psi. The acceptable leakage rate shall not exceed .092 gallons per inch of pipe diameter per 1,000 feet of pipe per hour.

Failure of the water main to comply with the above acceptable leakage rate, shall require the contractor to replace any defective materials to insure a watertight installation. If it is deemed that the existing blow-off valve is the cause of failure, the party responsible for the water main extension shall also be responsible for adding a valve at that location and abandoning the existing valve. After any inadequacies have been corrected, the leakage rate will again be tested. This test shall be repeated until that portion of main is brought to compliance with the permissible leakage rate.

B. Prerequisite conditions for inspection prior to testing shall be as follows:

1. Hydrants shall be properly located, operable, plumb and at correct elevation.

2. Valves shall be properly located, operable and at correct elevation. Valve boxes or manholes shall be centered over operating nuts, and the top of the box or manhole shall be at proper elevation.

3. Lines shall be properly vented where entrapped air is a consideration.

3.16 CHLORINATION

A. All additions or replacements to the water system, including fire lines and backflow prevention devices, shall be chlorinated before being placed in service. Such chlorination must take place under the supervision of an inspector.

B. Pipe subjected to contaminating materials shall be treated as directed by the Fayetteville's Public Works Commission's Water Distribution or Engineer. Should such treatment fail to cleanse the pipe, replacement shall be required. The PWC shall bear no portion of any cost sustained by the contractor in meeting this specification.

C. Chlorination of a completed line shall be carried out after completing the pressure test and in the following manner.

1. Taps will be made at the control valve at the upstream end of the line and at all extremities of the line including valves. These taps shall be located in such a manner as to allow HTH solution to be fed into all parts of the line.

2. A solution of water containing high test hypochlorite (70%) available chlorine or chlorine gas solution shall be introduced into the line by regulated pumping at the control valve tap. The solution shall be of such a concentration that the line shall have a uniform concentration of 50 ppm total chlorine immediately after chlorination. The chart below shows the required quantity of 70% HTH compound to be contained in solution in each 1000-foot section of line to produce the desired concentration of 50 ppm.

Pipe Size	Pounds of high-Test Hypochlorite (70%) Per 1000' of Line
6"	.88
8"	1.56
10"	2.42
12"	3.50
14"	4.76
16"	6.22
20"	9.76
24"	14.00
30"	21.00
36"	31.50
48"	56.00

3. The HTH solution shall be circulated in the main by opening the control valve and systematically manipulating hydrants and taps at the line extremities. The HTH solution must be pumped in at a constant rate for each discharge rate in order that a uniform concentration will be produced in the mains.

4. Services shall be sterilized by methods acceptable to the Fayetteville's Public Works Commission's Water Distribution Division or Engineer, and the contractor shall have the same responsibility for laterals as for mains in regard to bearing full cost of any corrective measures needed to comply with bacteriological or other requirements.

5. HTH solution shall remain in lines for no less than twenty-four hours, unless otherwise directed by the Fayetteville's Public Works Commission's Water Distribution Division or Engineer.

6. 5) Extreme care will be exercised at all times to prevent the HTH solution from entering existing mains.

3.17 BACTERIOLOGICAL SAMPLING

A. Free residual chlorine after twenty-four hours shall be at least 10 ppm, or the Fayetteville's Public Works Commission's Water Distribution Divisionor Engineer will require the lines be re-chlorinated.

B. Mains will be flushed with a blow-off assembly of sufficient size to effectively clean the main. Detail W-22. Flushing of lines may proceed after twenty-four hours, provided the free residual chlorine analysis is satisfactory. Flushing shall be continued until chlorine returns to normal level. In times of water shortages or distribution main problems, the flushing operation may be delayed. The Fayetteville's Public Works Commission's Water Distribution Division shall determine when flushing is allowable. The contractor

shall advise the inspector prior to the chlorination and flushing so that the inspector can advise the Fayetteville's Public Works Commission's Water Distribution Division of the construction location, size and length of mains. All tests will be done in the presence of an inspector. Flushing will be for short duration. Sufficient precautions must be taken to the satisfaction of the inspector to ensure that the impact of the water is absorbed, and the water is conveyed without erosion or property drainage. All flush water shall be de-chlorinated using methods acceptable to the Fayetteville's Public Works Commission's Water Distribution Division.

C. After flushing is completed, the Fayetteville's Public Works Commission's Water Distribution Division or Fayetteville's Public Works Commission's Water Distribution DivisionInspector shall collect samples for turbidity and bacteriological analysis for each section of pipe between main line valves. Sample point locations shall be determined by a representative of the engineer or owner. A custody seal shall be placed on each set of turbidity and bacteriological bottles. A chain of custody form must be completed for sample set(s) collected and must be delivered along with the sample(s). A turbidity test will be done. If the turbidity exceeds 1 NTU, the sample fails and a bacteriological test will not be set up. The Fayetteville's Public Works Commission's Water Distribution Divisionwill perform the turbidity and bacteriological analysis.

D. Samples will be accepted between 8:00 AM and 12 NOON and 1PM and 3:30 PM Monday through Thursday, excluding holidays. Special arrangements may be made for samples to be accepted outside of this time frame by calling the laboratory in advance.

E. In the event that two successive bacteriologic tests fail, that section of the main shall be re- chlorinated by the contractor and new tests performed prior to moving to the next section of main.

3.18 WATER MAIN AND SERVICE ABANDONMENT

A. Contractors abandoning water services shall remove the entire service stub. When available, a mechanical plug shall be used to abandon the corporation cock. If equipment necessary to plug the main is not available, the corporation stop shall be turned off and capped. A ½" PVC pipe shall extend a minimum of 12" above the capped corporation stop, wrapped at least 3 times with caution tape to identify an abandoned tap. All remaining portions of the service stub shall be removed from the main to the right of way line and shall be disposed of properly. Water main abandonment must be performed in accordance with a plan approved by Fayetteville's Public Works Commission's Water Distribution Division. Service and main abandonment requires a stub permit for inspection by a Public Utilities Inspector at (910) 223-4730, in the merger areas.

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SECTION 334200 - STORMWATER CONVEYANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Concrete pipe and fittings.
2. Non-pressure transition couplings.
3. Cleanouts.
4. Drains.
5. Encasement for piping.
6. Manholes.
7. Catch basins.
8. Stormwater inlets.
9. Stormwater detention structures.
10. Pipe outlets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Catch basins and stormwater inlets. Include plans, elevations, sections, details, frames, covers, and grates.
3. Stormwater Detention Structures: Include plans, elevations, sections, details, frames, covers, design calculations, and concrete design-mix reports.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

B. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes in accordance with manufacturer's written rigging instructions.

D. Handle catch basins and stormwater inlets in accordance with manufacturer's written rigging instructions.

1.7 FIELD CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:

1. Notify Construction Manager no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 CONCRETE PIPE AND FITTINGS

A. Source Limitations: Obtain concrete pipe and fittings from single manufacturer.

B. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C76.

1. Bell-and-spigot ends and gasketed joints with ASTM C443, rubber gaskets
2. Class III, Wall B.
3. Class IV, Wall B.

2.2 CLEANOUTS

A. Cast-Iron Cleanouts:
1. Source Limitations: Obtain cast-iron cleanouts from single manufacturer.

2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside caulk or spigot connection and countersunk, tapered-thread, brass closure plug.
3. Top-Loading Classification(s): Light Duty and Heavy Duty.
4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts:
1. Source Limitations: Obtain PVC cleanouts from single manufacturer.
2. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.3 DRAINS

A. Cast-Iron Area Drains:
1. Source Limitations: Obtain cast-iron area drains from single manufacturer.
2. Description: ASME A112.6.3 gray-iron round body with anchor flange and round secured grate. Include bottom outlet with inside caulk or spigot connection, of sizes indicated.
3. Top-Loading Classification(s): Medium Duty and Heavy Duty.

B. Grate Openings: 1/4-inch circular.

2.4 ENCASEMENT FOR PIPING

A. Standard: ASTM A674 or AWWA C105/A21.5.

B. Material: Linear low-density polyethylene film of 0.008-inch minimum thickness.

C. Form: Sheet.

D. Color: Black.

2.5 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.

5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
7. Joint Sealant: ASTM C990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
10. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Designed Precast Concrete Manholes:

1. Description: ASTM C913; designed in accordance with ASTM C890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
2. Ballast: Increase thickness of one or more precast concrete sections or add concrete to manhole as required to prevent flotation.
3. Joint Sealant: ASTM C990, bitumen or butyl rubber.
4. Resilient Pipe Connectors: ASTM C923, cast or fitted into manhole walls, for each pipe connection.
5. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60inches.
6. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange and 26-inch-diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
2. Material: ASTM A48/A48M, Class 35 gray iron unless otherwise indicated.

2.6 CONCRETE

A. General: Cast-in-place concrete in accordance with ACI 318, ACI 350, and the following:

1. Cement: ASTM C150/C150M, Type II.
2. Fine Aggregate: ASTM C33/C33M, sand.
3. Coarse Aggregate: ASTM C33/C33M, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615/A615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

   a. Invert Slope: 1 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

   a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615/A615M, Grade 60 (420 MPa) deformed steel.

2.7 CATCH BASINS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.

4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C990, bitumen or butyl rubber.
6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
8. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60inches.
9. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

B. Designed Precast Concrete Catch Basins: ASTM C913, precast, reinforced concrete; designed in accordance with ASTM C890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for joint sealants.

1. Joint Sealants: ASTM C990, bitumen or butyl rubber.
2. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and grate.
4. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60inches.
5. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

C. Frames and Grates: ASTM A536, Grade 60-40-18, ductile iron designed for A-16 (AASHTO HS20-44), structural loading. Include flat grate with small, square or short-slotted drainage openings.

1. Size: 24 by 24 inches minimum unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

D. Frames and Grates: ASTM A536, Grade 60-40-18, ductile iron designed for A-16 (AASHTO HS20-44), structural loading. Include 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange, and 26-inch-diameter flat grate with small, square or short-slotted drainage openings.

1. Grate Free Area: Approximately 50 percent unless otherwise indicated.

2.8 STORMWATER INLETS

A. Curb Inlets: Made with vertical curb opening, of materials and dimensions in accordance with utility standards.

B. Gutter Inlets: Made with horizontal gutter opening, of materials and dimensions in accordance with utility standards. Include heavy-duty frames and grates.

C. Combination Inlets: Made with vertical curb and horizontal gutter openings, of materials and dimensions in accordance with utility standards. Include heavy-duty frames and grates.

D. Frames and Grates: Heavy duty, in accordance with utility standards.

2.9 STORMWATER DETENTION STRUCTURES

A. Cast-in-Place Concrete, Stormwater Detention Structures: Constructed of reinforced-concrete bottom, walls, and top; designed in accordance with ASTM C890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.

1. Ballast: Increase thickness of concrete as required to prevent flotation.
2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch-diameter frame and cover.
3. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of structure to finished grade is less than 60inches.

B. Manhole Frames and Covers: ASTM A536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch-minimum width flange, and 26-inch-diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."

2.10 PIPE OUTLETS

A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.

B. Riprap Basins: Broken, irregularly sized and shaped, graded stone in accordance with NSSGA's "Quarried Stone for Erosion and Sediment Control."

1. Class I as defined by the N.C. Department of Transportation, ranging in size from 6” to 10” in diameter and weighting from 5 lbs. to 200 lbs. with at least 30% of the rip-rap weighting at least 60 lbs

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

F. Install gravity-flow, nonpressure drainage piping in accordance with the following:

1. Install piping pitched down in direction of flow.
2. Install piping with 24- inch-minimum cover.
3. Install PE corrugated sewer piping in accordance with ASTM D2321.
4. Install PVC cellular-core piping in accordance with ASTM D2321 and ASTM F1668.
5. Install PVC sewer piping in accordance with ASTM D2321 and ASTM F1668.
6. Install PVC profile gravity sewer piping in accordance with ASTM D2321 and ASTM F1668.
7. Install PVC water-service piping in accordance with ASTM D2321 and ASTM F1668.
8. Install fiberglass sewer piping in accordance with ASTM D3839 and ASTM F1668.
9. Install nonreinforced-concrete sewer piping in accordance with ASTM C1479 and ACPA's "Concrete Pipe Installation Manual."

10. Install reinforced-concrete sewer piping in accordance with ASTM C1479 and ACPA's "Concrete Pipe Installation Manual."

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping in accordance with the following:
   1. Join PVC sewer piping in accordance with ASTM D2321 and ASTM D3034 for elastomeric-seal joints or ASTM D3034 for elastomeric-gasketed joints.
   2. Join PVC profile gravity sewer piping in accordance with ASTM D2321 for elastomeric-seal joints or ASTM F794 for gasketed joints.
   3. Join fiberglass sewer piping in accordance with ASTM D3839 for elastomeric-seal joints.
   4. Join nonreinforced-concrete sewer piping in accordance with ASTM C14 and ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
   5. Join reinforced-concrete sewer piping in accordance with ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
   6. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

   1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inches above surrounding earth grade.

C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 DRAIN INSTALLATION

A. Install type of drains in locations indicated.

   1. Use Light-Duty, top-loading classification drains in earth or unpaved foot-traffic areas.
   2. Use Medium-Duty, top-loading classification drains in paved foot-traffic areas.
   3. Use Heavy-Duty, top-loading classification drains in vehicle-traffic service areas.
   4. Use Extra-Heavy-Duty, top-loading classification drains in roads.

B. Embed drains in 4-inch-minimum concrete around bottom and sides.

C. Fasten grates to drains if indicated.

D. Set drain frames and covers with tops flush with pavement surface.

3.6 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants in accordance with ASTM C891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

3.7 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.8 STORMWATER INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipaters at outlets, as indicated.

3.9 CONCRETE PLACEMENT

A. Place cast-in-place concrete in accordance with ACI 318.

3.10 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 221413 "Facility Storm Drainage Piping."

B. Connect force-main piping to building's storm drainage force mains specified in Section 221413 "Facility Storm Drainage Piping." Terminate piping where indicated.

C. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

D. Connect to sediment interceptors specified in Section 221323 "Sanitary Waste Interceptors."

3.11 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:

1. Close open ends of piping with at least 8- inch-thick, brick masonry bulkheads.

2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:

1. Remove manhole or structure and close open ends of remaining piping.
2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

C. Backfill to grade in accordance with Section 312000 "Earth Moving."

3.12 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems in accordance with requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test in accordance with requirements of authorities having jurisdiction, UNI-B-6, and the following:

    a. Exception: Piping with soil tight joints unless required by authorities having jurisdiction.

b. Option: Test plastic piping in accordance with ASTM F1417.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.

3.13 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with water.

END OF DOCUMENT 334200

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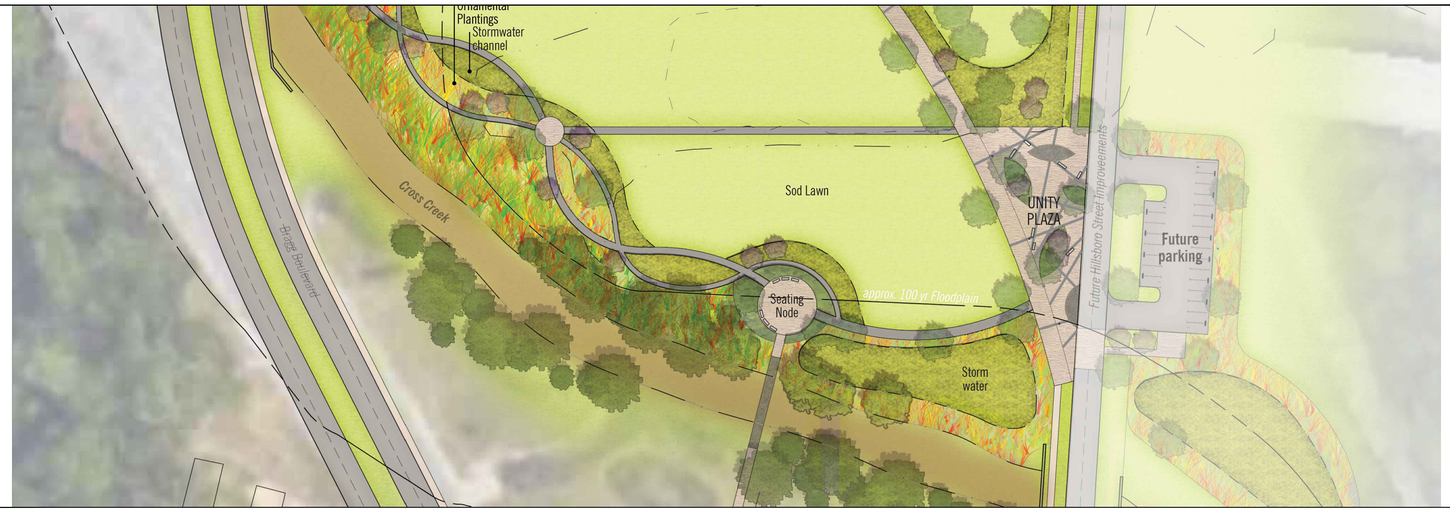
APPENDIX B

PLACEHOLDER

BID SET PLANS AND DRAWINGS

NORTH CAROLINA VETERANS PARK PHASE II

Fayetteville,
North Carolina



PACKAGE

SEAL | DATE 09.03.21

REVISED BID SET

OWNER
CITY OF FAYETTEVILLE
121 Lamon Street
Fayetteville, NC 28301

LANDSCAPE ARCHITECT
RATIO
227 Fayetteville Street, Suite 301
Raleigh, North Carolina 27601

CIVIL ENGINEER / ENVIRONMENTAL
GFT Infrastructure, Inc.
1 Glenwood Ave., Suite 600
Raleigh, NC 27603

WATER RESOURCES
Tomo Engineering
2319 Cardinal Drive
Durham, NC 27707

ELECTRICAL ENGINEER
THE WOOTEN COMPANY
120 North Boylan Avenue
Raleigh, NC 27603

VOLUME
1

RATIO PROJECT NO.
19097

DATE
07.24.2026

PROJECT ADDRESS
300 BRAGG BLVD.
FAYETTEVILLE, NC
28301

VOLUME	1
SET NO.	
DATE	07.24.2026
PACKAGE	REVISED BID SET
RATIO PROJECT NO.	19097.000
PROJECT NAME	NORTH CAROLINA VETERANS PARK PHASE II

SHEET_INDEX

SHEET	DESCRIPTION
G-000	Cover Sheet
G-001	General Project Notes
L-011	Scope of Work Plan
L-201	Site Features Plan
L-202	Site Features Plan
L-203	Site Features Plan
L-204	Site Features Plan
L-205	Site Features Plan
L-206	Site Features Plan
L-501	Planting Plan
L-502	Planting Plan
L-503	Planting Plan
L-504	Planting Plan
L-505	Planting Plan
L-506	Planting Plan
L-601	Irrigation Plan Diagram
L-602	Soil Placement Plan
L-701	Site Details
L-702	Site Details
L-703	Site Details
L-704	Site Details
L-705	Site Details
L-706	Site Details
C-101	Existing Conditions Plan
C-201	Demolition Plan
C-301	Erosion Control Plan
C-401	Stormwater Control Plan
C-400	Site Layout Plan
C-501	Site Construction Details
C-502	Site Construction Details
C-503	Site Construction Details
C-504	Site Construction Details
C-505	Site Construction Details
C-506	Site Construction Details
C-507	Site Construction Details
C-508	Site Construction Details
C-509	Site Construction Details
C-510	Site Construction Details
E-0.1	Electrical Cover Sheet
E-1.1	Electrical Plan NE
E-1.2	Electrical Plan SW
SL-1.1	Photometric Plan Northwest Area
SL-1.2	Photometric Plan Southeast Area

GENERAL PROJECT NOTES

A. THE FOLLOWING GENERAL NOTES APPLY TO THESE CONTRACT DOCUMENTS AND ARE NOT SPECIFIC TO ANY ONE DISCIPLINE.

B. IT IS THE CONTRACTORS RESPONSIBILITY TO REVIEW AND COORDINATE THE WORK OF ALL SUB-CONTRACTORS, TRADES AND SUPPLIERS WITH THE REQUIREMENTS OF THE CONTRACT BEFORE COMMENCING CONSTRUCTION, AND TO ASSURE THAT ALL PARTIES ARE AWARE OF ALL REQUIREMENTS, REGARDLESS OF WHERE THE REQUIREMENTS OCCUR IN THE CONTRACT DOCUMENTS, WHICH MIGHT AFFECT THE WORK OF THAT PARTY.

C. PARTIAL SETS OF DRAWINGS ARE INCOMPLETE AND SHOULD NOT BE DISTRIBUTED OR UTILIZED BY THE CONTRACTOR.

D. THE CONSTRUCTION DOCUMENTS ESTABLISH DETAILED MINIMUM REQUIREMENTS FOR THE CONSTRUCTION OF THE PROJECT.

E. THE LANDSCAPE ARCHITECTURAL DRAWINGS ESTABLISH, COORDINATE AS WELL AS TAKE PRECEDENCE FOR THE FINISH APPEARANCE OF ALL EXPOSED ELEMENTS OF THE WORK OF ALL TRADES INCLUDING THAT WORK WHICH IS ILLUSTRATED PRIMARILY ON DRAWINGS OF OTHER DISCIPLINES.

F. THE DRAWINGS MAY MAKE REFERENCE TO AND/OR ILLUSTRATE ITEMS WHICH ARE NOT PART OF THE WORK OF THE CONTRACT. THESE "NOT IN CONTRACT" ITEMS ARE REFERENCED AND/OR ILLUSTRATED FOR THE CONTRACTORS REFERENCE, INFORMATION AND COORDINATION ONLY.

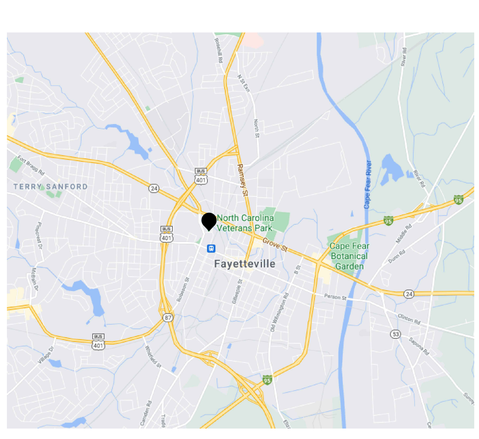
G. THE CONTRACTOR IS RESPONSIBLE TO COMPLY WITH APPLICABLE LAWS, CODES, REGULATIONS AND ORDINANCES OF THE PLACE (CITY, COUNTY, DISTRICT AND STATE) WHERE THE PROJECT IS LOCATED - ALTHOUGH SUCH REQUIREMENTS MAY NOT BE REFLECTED BY THESE CONTRACT DOCUMENTS.

H. EXISTING CONDITIONS SHOWN ARE FROM AVAILABLE RECORD DRAWINGS AND OR VISUAL FIELD SURVEYS. THE CONTRACTOR SHALL VERIFY ACTUAL EXISTING CONDITIONS AT THE SITE PRIOR TO SUBMITTING A BID. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OF ANY DISCREPANCIES.

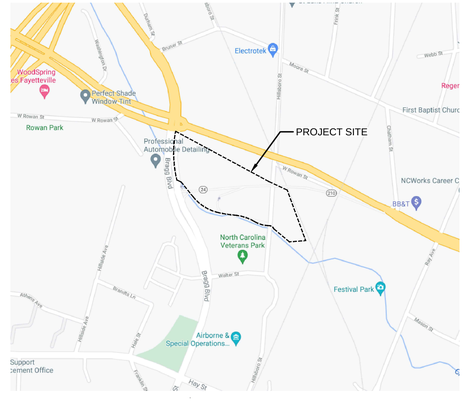
I. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND SIMILAR RELEASES REQUIRED FOR THE CONSTRUCTION AND OCCUPANCY OF THE PROJECT. THE CONTRACTOR SHALL FURNISH COPIES OF ALL SUCH ITEMS TO THE OWNER AND ARCHITECT WITHIN 10 DAYS OF RECEIPT OF SUCH ITEMS. IF PERMITS ARE ISSUED SUBJECT TO CERTAIN CONDITIONS OR REVISIONS TO THE WORK OR IF PERMITS ARE DELAYED FOR ANY REASON, THE CONTRACTOR SHALL NOTIFY THE OWNER AND LANDSCAPE ARCHITECT.

J. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO MAINTAIN AND PROTECT NEW WORK AS WELL AS EXISTING SYSTEMS AND ELEMENTS WHICH ARE TO REMAIN. ANY DAMAGE TO SUCH SYSTEMS AND ELEMENTS SHALL BE IMMEDIATELY REPAIRED IN A MANNER ACCEPTABLE TO THE LANDSCAPE ARCHITECT. IF SATISFACTORY REPAIRS CANNOT BE MADE, THE CONTRACTOR SHALL REPLACE SYSTEMS AND ELEMENTS WITH "LIKE NEW" QUALITY ACCEPTABLE TO THE LANDSCAPE ARCHITECT. ALL REPAIRS AND REPLACEMENT COST SHALL BE THE FINANCIAL RESPONSIBILITY OF THE CONTRACTOR.

REGIONAL MAP



PROJECT LOCATION



North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

Owner
City of Fayetteville
121 Lamon Street
Fayetteville, NC 28301

Landscape Architect
RATIO
227 Fayetteville Street, Suite 301
Raleigh, North Carolina 27601
919-821-0805

Civil Engineer / Environmental
GFT Infrastructure, Inc.
1 Glenwood Ave., Suite 600
Raleigh, NC 27603

Water Resources
Tomo Engineering
2319 Cardinal Drive
Durham, NC 27707

Electrical Engineer
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603

KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	REVISED BID SET	07/24/26

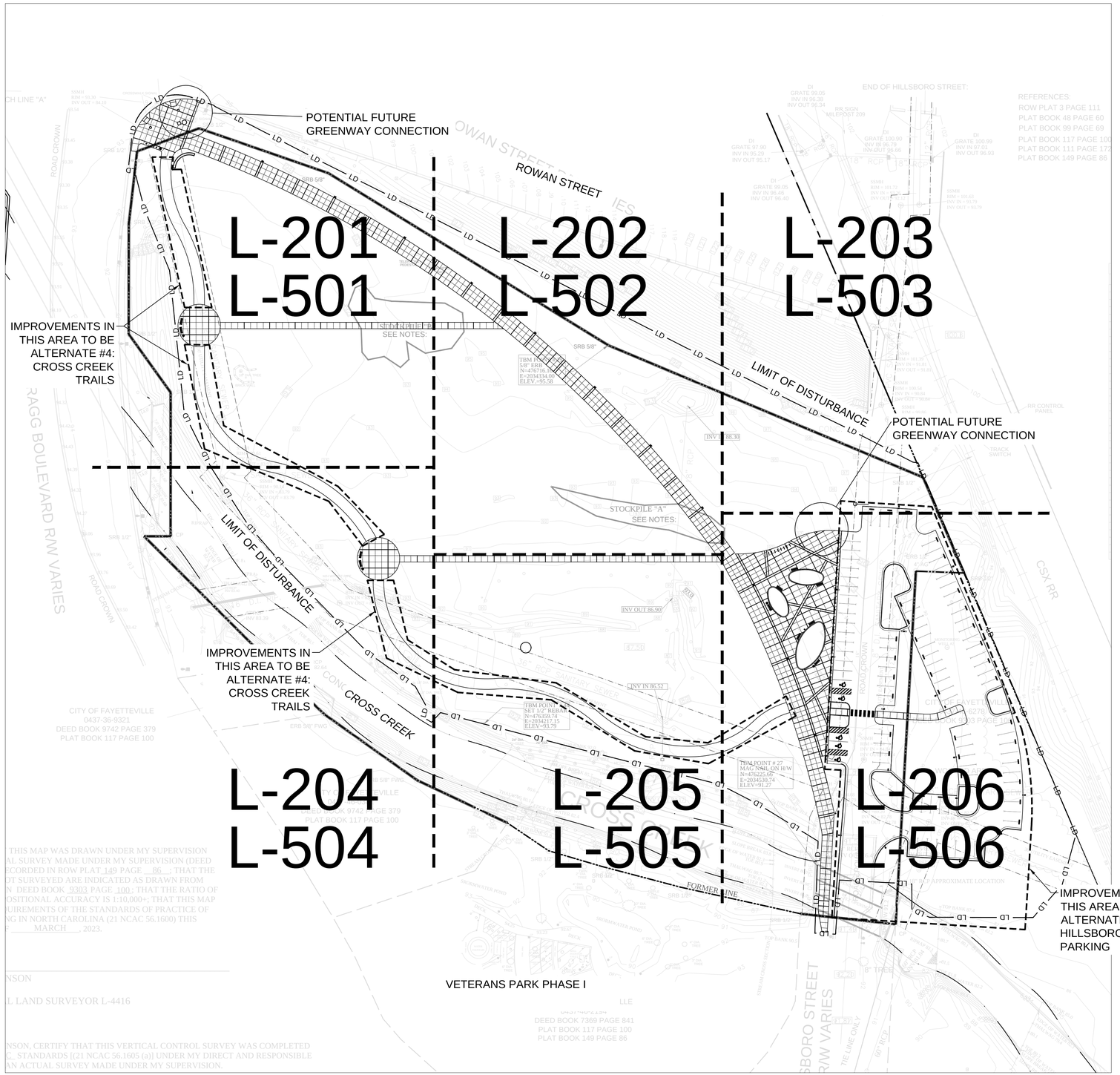
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PROJECT NO. 19097.000

SHEET TITLE
GENERAL PROJECT NOTES

SHEET NUMBER
G-001



01 L-011 Scope of Work Plan

SCALE 0 25' 50' 100'

THIS MAP WAS DRAWN UNDER MY SUPERVISION.
AL SURVEY MADE UNDER MY SUPERVISION (DEED
CORDED IN ROW PLAT 149 PAGE 86 ; THAT THE
OT SURVEYED ARE INDICATED AS DRAWN FROM
N DEED BOOK 9303 PAGE 100 ; THAT THE RATIO OF
OSITIONAL ACCURACY IS 1:10,000+; THAT THIS MAP
UIREMENTS OF THE STANDARDS OF PRACTICE OF
NG IN NORTH CAROLINA (21 NCAC 56.1600) THIS
MARCH , 2023.

NSON

L LAND SURVEYOR L-4416

NSON, CERTIFY THAT THIS VERTICAL CONTROL SURVEY WAS COMPLETED
C. STANDARDS [(21 NCAC 56.1605 (a)] UNDER MY DIRECT AND RESPONSIBLE
AN ACTUAL SURVEY MADE UNDER MY SUPERVISION.

NC VETERANS PARK PHASE II

Base Bid	QTY		UNIT
Concrete Paving (Medium Duty)	-	26,965	SF
Concrete Paving (Specialty Finish - Exposed Aggregate)	-	2,398	SF
Vertical Curb	3	179	SF
Sandblasted Word Inscription	26	1	LS
Backed Bench	11	-	Each
Flagpole	2	-	Each
Trash Receptacle	5	-	Each
Pedestrian Light	16		Each
Bike Racks	1 (w/ 14 spaces)		LS
Mobilization	1	-	LS
Construction Survey + Staking	1	-	LS
Construction Entrance (Install)	1	-	LS
Construction Entrance (Remove)	1	-	LS
Tree Protection Fencing	1	-	LS
Earthwork/Grading	1	-	LS
Ste Demo	1	-	LS
	-	-	
Drain Structures (Drop inlets& Grates)	4	-	EA
Drain Structures (Outlets)	2	-	LF
Drainage RCP	600	-	LF
Drainage Rip-Rap	-	200	SF
Erosion Control - Inlet Protection	4	-	EA
Erosion Control - Slt Fence	2550	-	LF
Temp Diversion Ditch	375	-	LF
Eletrical Service Connection	1	-	LS
Electrical Conduit	1	-	LS
Topsoil Mix	1	-	LS
Concrete, Cast-in-Place, Monument Sign	1	-	LS

Alternates	QTY		UNIT
Asphalt Paving (Light Duty - Walkway)	-	8,783	SF
Parking Lot			
- Vertical Curb	8	366	Each
- Wheel Stop	35	-	Each
- Bollard	25	-	Each
- Street Light (Dual Head)	1	-	Each
- Street Light (Single Head)	15	-	Each
- Asphalt (Heavy Duty) OR Permeable Pavers	-	34,838	SF
- Concrete Paving (Medium Duty)	-	589	SF
- Tactile Warning Surfacing	-	195	SF
- Pavement Marking	99	1,782	LF
- Signage		1	LS
Parking Lot Planting Areas			
- 2" Cal. Tree (B+B)	4	-	EA
- 3" Cal. Tree (B+B)	13	-	EA
- 3 Gal. Shrub	48	-	EA
- Assorted Sedges	-	3,320	SF
- Bermuda Seed	-	18,597	SF
Planting Areas (Excl. Parking Lot)			
- 2" Cal. Tree (B+B)	7	-	EA
- 3" Cal. Tree (B+B)	32	-	EA
- 3 Gal. Shrub	55	-	EA
- 1 Gal. Shrub	27	-	EA
- Assorted Perennials - 3"-7" pots	770	-	EA
- Bermuda Seed	-	293,490	SF
Irrigation Design Plans	1	-	LS
Irrigation Tap & Meter	1	-	EA
Irrigation System (includes furnishing and installation of all necessary equipment and materials for irrigation i.e pipes, valves, connectors, heads, etc.)	1	-	LS

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

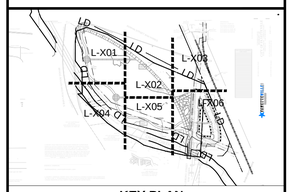
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227 Fayetteville Street, Suite 301
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KEY PLAN

SEAL | DATE 01/26/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

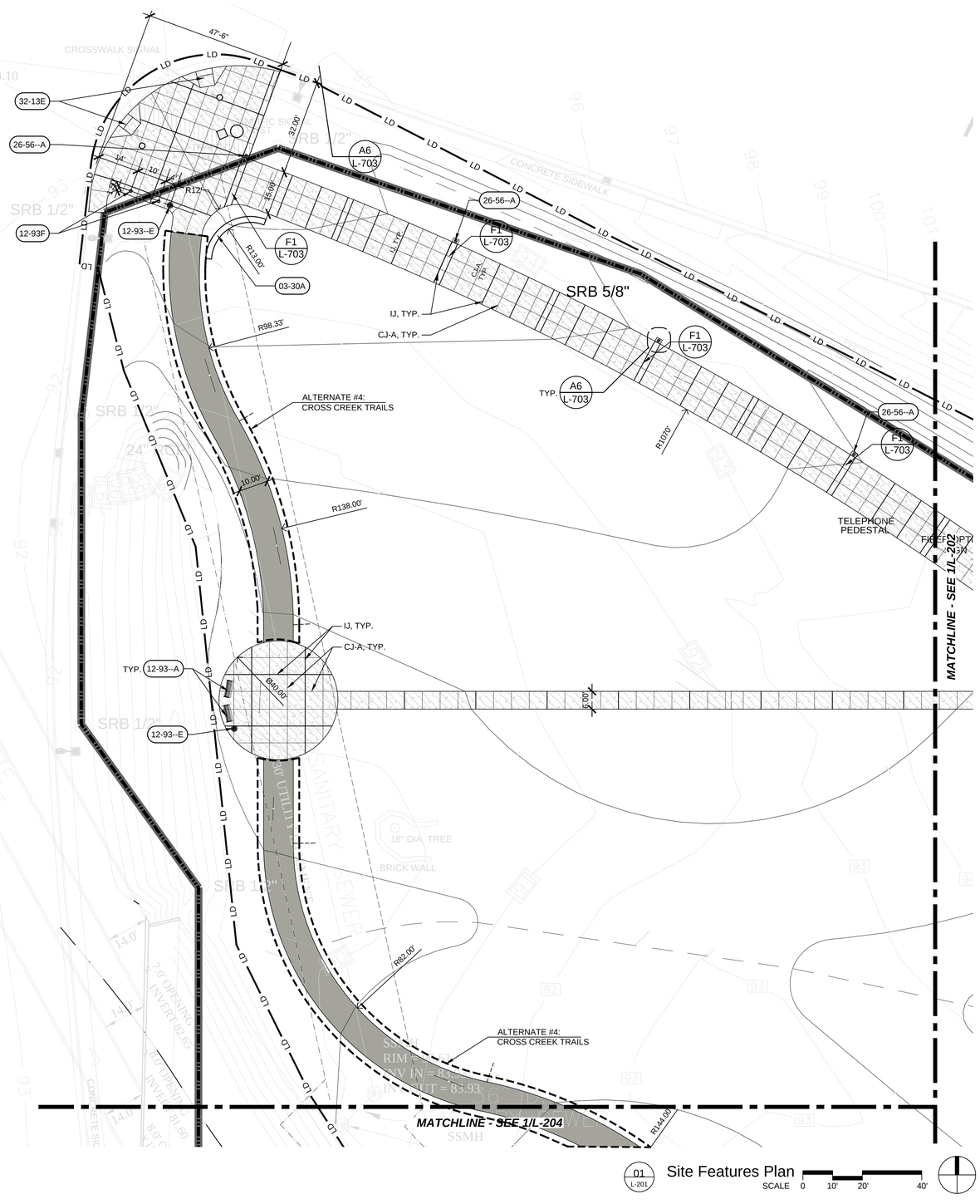
01	BID SET	01/26/26
02	ADDENDUM 02	04/10/26
03	REVISED BID SET	07/24/26

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PROJECT NO. 19097.000

SHEET TITLE
SCOPE OF WORK PLAN

SHEET NUMBER
L-011



01 L-201 Site Features Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

1. DO NOT SCALE DRAWINGS FOR FIELD LAYOUT. REFER TO SITE LAYOUT PLAN(S) FOR DIMENSIONS.
2. WORK SHOWN ON THE DRAWINGS SHALL BE BASE BID UNLESS SPECIFICALLY NOTED TO BE BY ALTERNATE BID.
3. COORDINATE ALL WORK WITH OTHER DESIGN DISCIPLINES.
3. EXISTING AND PROPOSED UTILITIES THAT ARE SHOWN ARE FOR REFERENCE ONLY. REFER TO THE SITE SURVEY FOR EXISTING UTILITIES AND VERIFY IN THE FIELD. REFER TO THE SITE ELECTRICAL PLAN FOR PROPOSED LIGHTING AND OUTLETS. REFER TO CIVIL DRAWINGS FOR ALL OTHER PROPOSED UTILITIES.
4. REFERENCE NOTES SCHEDULE MAY APPEAR ON MULTIPLE SHEETS. NOT ALL REFERENCE NOTES APPEAR ON EACH SHEET.
5. REFER TO XX/00 FOR CONCRETE PAVING JOINT DETAILS.
   - 5.1. 'IJ' DENOTES ISOLATION JOINT.
   - 5.2. 'CJ-A' DENOTES CONTRACTION JOINT 'A'.
6. ALL CONCRETE PAVING JOINTS SHALL BE CONTRACTION JOINT 'A' UNLESS INDICATED OTHERWISE.
7. [REFER TO CIVIL DRAWINGS FOR ALL PAVING IN THE PUBLIC RIGHT-OF-WAY UNLESS OTHERWISE INDICATED IN THE LANDSCAPE DRAWINGS.]
8. THE LANDSCAPE ARCHITECT'S AUTOCAD FILE(S) MAY BE MADE AVAILABLE TO THE SUCCESSFUL BIDDER(S) FOR LAYOUT PURPOSES UPON REQUEST AND RECEIPT OF A SIGNED CAD WAIVER.

REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION	DETAIL
CAST-IN-PLACE CONCRETE		
03-30A	CONCRETE, CAST-IN-PLACE, MONUMENT SIGN	A1/L-704
PRECAST ARCHITECTURAL CONCRETE	ALTERNATE #1: HILLSBORO ST PARKING	
03-45A	PRECAST WHEEL STOP	F5/L-702
10 SPECIALTIES		
10-14A	ACCESSIBLE PARKING SIGN	E6/L-705
12 FURNISHINGS		
12-93--A	SITE FURNISHING, BACKED BENCH, N.I.C.	D6/L-702
12-93--B	SITE FURNISHING, BOLLARD (ALTERNATE #1: HILLSBORO ST PARKING)	D1/L-703
12-93--C	SITE FURNISHING, BOLLARD, REMOVABLE	D3/L-703
12-93--D	SITE FURNISHING, BIKE RACK, N.I.C.	D4/L-702
12-93--E	SITE FURNISHING, TRASH RECEPTACLE, N.I.C.	A5/L-705
12-93F	SITE FURNISHINGS, FLAGPOLE	C6/L-706
26 ELECTRICAL		
26-56--A	EXTERIOR LIGHTING, PEDESTRIAN LIGHT POLE	/
32 EXTERIOR IMPROVEMENTS	ALTERNATE #4: CROSS CREEK TRAILS	
	ASPHALT PAVING, LIGHT DUTY	A3/L-701
	ASPHALT PAVING, HEAVY DUTY	A1/L-701
RIGID PAVING	ALTERNATE #1: HILLSBORO ST PARKING	
	CONCRETE PAVING, MEDIUM DUTY	D6/L-701
	CONCRETE PAVING - MEDIUM DUTY (SPECIALTY FINISH)	D6/L-701
32-13E	CURB RAMP	A5/L-706
CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS		
32-16--C	COMBINED CONCRETE CURBAND GUTTER (REF: CIVIL DWGS.)	
32-16--D	CONCRETE CURB, VERITCAL	/
32-16--F	CONCRETE CURB, FLUSH	B1/L-701
PAVING SPECIALTIES		
	PAVING SPECIALTIES, TACTILE WARNING SURFACING	A5/L-702

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

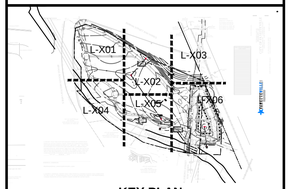
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Raleigh, NC 27603



KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
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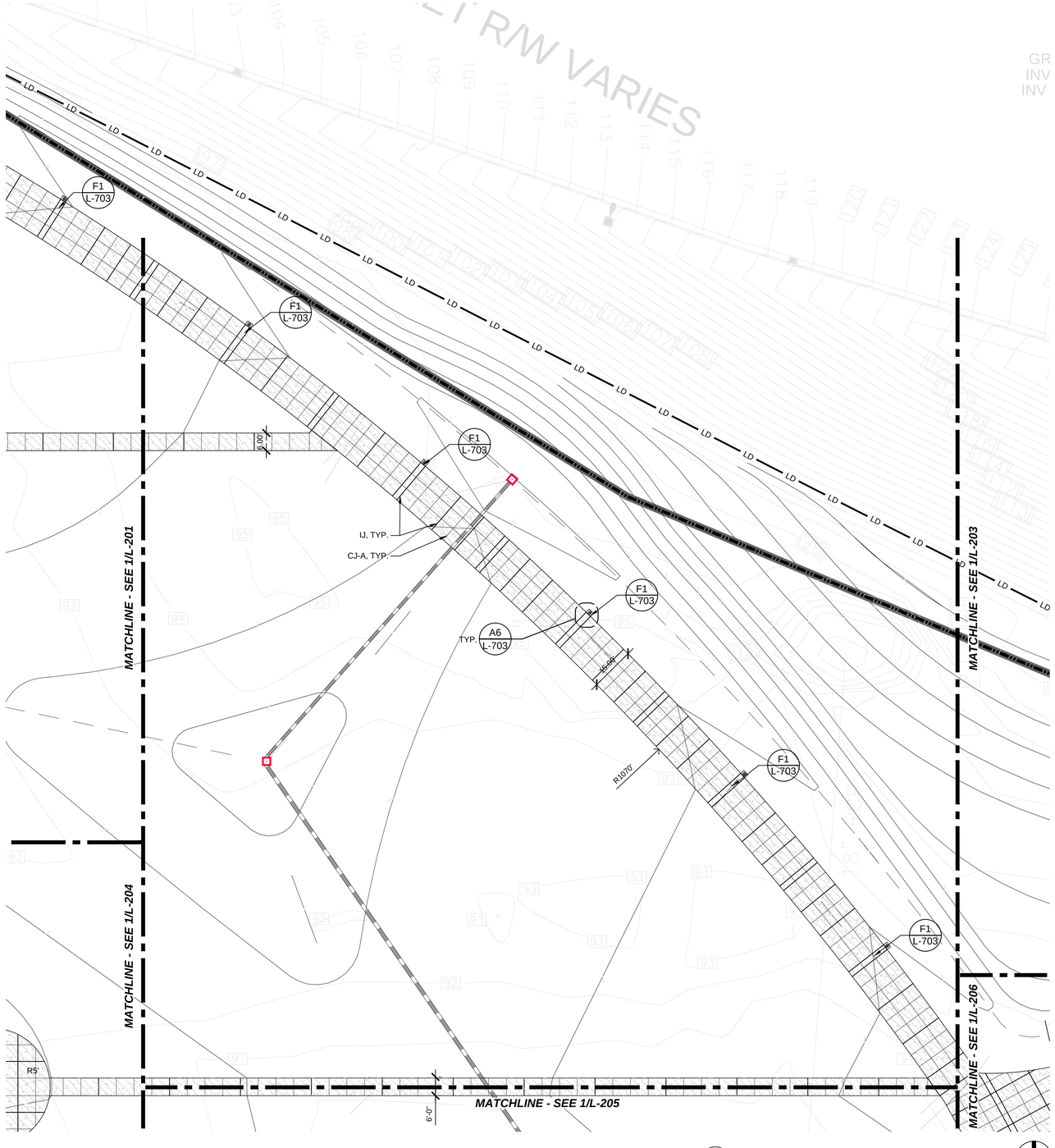
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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-201



01 L-202 Site Features Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

1. DO NOT SCALE DRAWINGS FOR FIELD LAYOUT. REFER TO SITE LAYOUT PLAN(S) FOR DIMENSIONS.
2. WORK SHOWN ON THE DRAWINGS SHALL BE BASE BID UNLESS SPECIFICALLY NOTED TO BE BY ALTERNATE BID.
3. COORDINATE ALL WORK WITH OTHER DESIGN DISCIPLINES.
3. EXISTING AND PROPOSED UTILITIES THAT ARE SHOWN ARE FOR REFERENCE ONLY. REFER TO THE SITE SURVEY FOR EXISTING UTILITIES AND VERIFY IN THE FIELD. REFER TO THE SITE ELECTRICAL PLAN FOR PROPOSED LIGHTING AND OUTLETS. REFER TO CIVIL DRAWINGS FOR ALL OTHER PROPOSED UTILITIES.
4. REFERENCE NOTES SCHEDULE MAY APPEAR ON MULTIPLE SHEETS. NOT ALL REFERENCE NOTES APPEAR ON EACH SHEET.
5. REFER TO XX/00 FOR CONCRETE PAVING JOINT DETAILS.

   5.1. 'IJ' DENOTES ISOLATION JOINT.

   5.2. 'CJ-A' DENOTES CONTRACTION JOINT 'A'.
6. ALL CONCRETE PAVING JOINTS SHALL BE CONTRACTION JOINT 'A' UNLESS INDICATED OTHERWISE.
7. [REFER TO CIVIL DRAWINGS FOR ALL PAVING IN THE PUBLIC RIGHT-OF-WAY UNLESS OTHERWISE INDICATED IN THE LANDSCAPE DRAWINGS.]
8. THE LANDSCAPE ARCHITECT'S AUTOCAD FILE(S) MAY BE MADE AVAILABLE TO THE SUCCESSFUL BIDDER(S) FOR LAYOUT PURPOSES UPON REQUEST AND RECEIPT OF A SIGNED CAD WAIVER.

REFERENCE NOTES SCHEDULE			
SYMBOL	DESCRIPTION		DETAIL
CAST-IN-PLACE CONCRETE			
03-30A	CONCRETE, CAST-IN-PLACE, MONUMENT SIGN		A1/L-704
PRECAST ARCHITECTURAL CONCRETE		ALTERNATE #1: HILLSBORO ST PARKING	
03-45A	PRECAST WHEEL STOP		F5/L-702
10 SPECIALTIES			
10-14A	ACCESSIBLE PARKING SIGN		E6/L-705
12 FURNISHINGS			
12-93--A	SITE FURNISHING, BACKED BENCH, N.I.C.	ALTERNATE #1: HILLSBORO ST PARKING	D6/L-702
12-93--B	SITE FURNISHING, BOLLARD		D1/L-703
12-93--C	SITE FURNISHING, BOLLARD, REMOVABLE		D3/L-703
12-93--D	SITE FURNISHING, BIKE RACK, N.I.C.		D4/L-702
12-93--E	SITE FURNISHING, TRASH RECEPTACLE, N.I.C.		A5/L-705
12-93F	SITE FURNISHINGS, FLAGPOLE		C6/L-706
26 ELECTRICAL			
26-56--A	EXTERIOR LIGHTING, PEDESTRIAN LIGHT POLE		/
32 EXTERIOR IMPROVEMENTS		ALTERNATE #4: CROSS CREEK TRAILS	
	ASPHALT PAVING, LIGHT DUTY		A3/L-701
	ASPHALT PAVING, HEAVY DUTY		A1/L-701
RIGID PAVING		ALTERNATE #1: HILLSBORO ST PARKING	
	CONCRETE PAVING, MEDIUM DUTY		D6/L-701
	CONCRETE PAVING - MEDIUM DUTY (SPECIALTY FINISH)		D6/L-701
32-13E	CURB RAMP		A5/L-706
CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS			
32-16--C	COMBINED CONCRETE CURBAND GUTTER (REF: CIVIL DWGS.)		
32-16--D	CONCRETE CURB, VERITCAL		/
32-16--F	CONCRETE CURB, FLUSH		B1/L-701
PAVING SPECIALTIES			
	PAVING SPECIALTIES, TACTILE WARNING SURFACING		A5/L-702

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

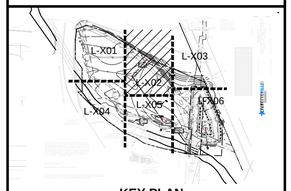
Owner
City of Fayetteville
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919-821-0805

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Water Resources
Tomo Engineering
2319 Cardinal Drive
Durham, NC 27707

Electrical Engineer
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603



KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	REVISED BID SET	07/24/26

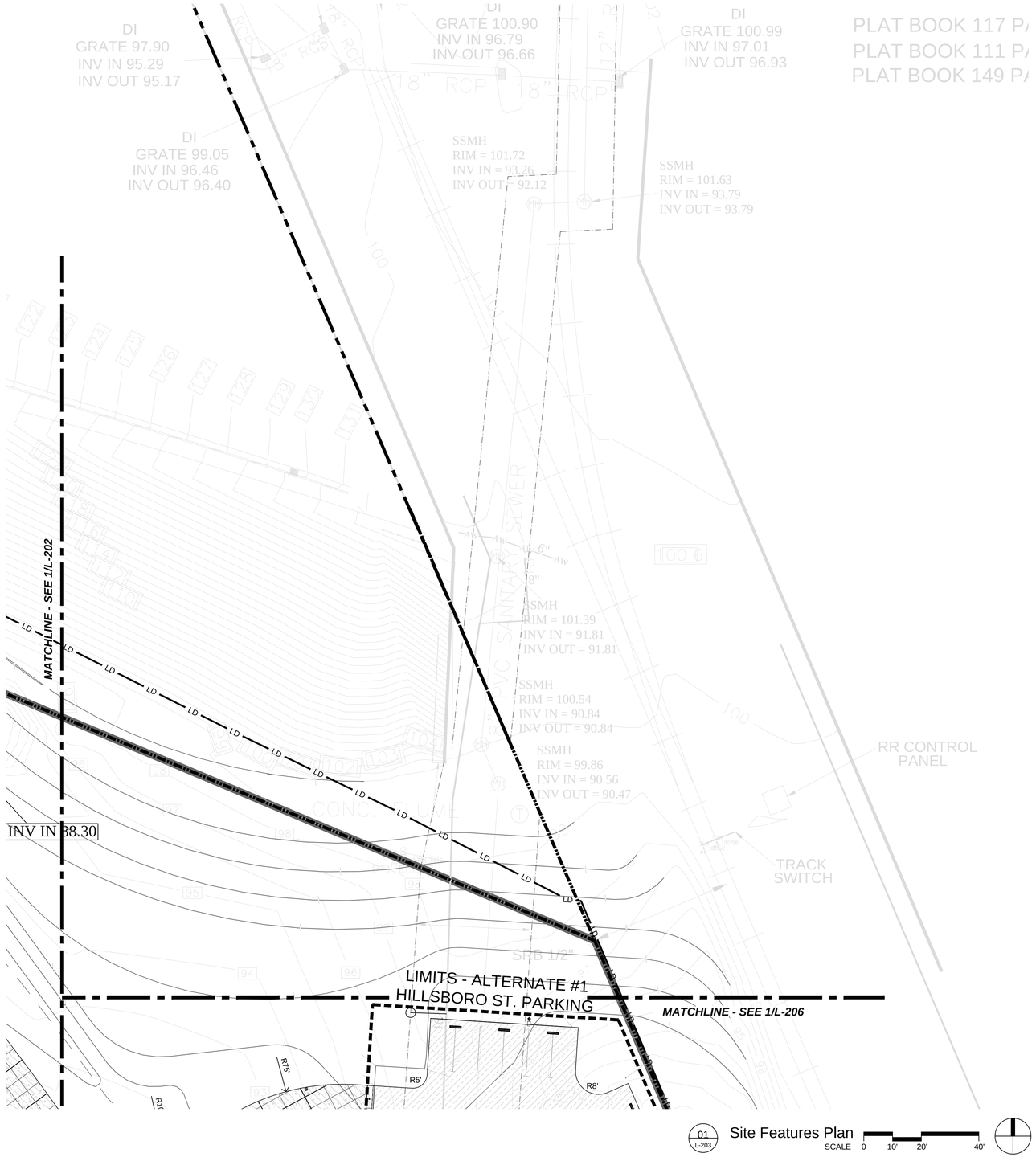
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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-202



01 L-203 Site Features Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

1. DO NOT SCALE DRAWINGS FOR FIELD LAYOUT. REFER TO SITE LAYOUT PLAN(S) FOR DIMENSIONS.
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REFERENCE NOTES SCHEDULE

SYMBOL	DESCRIPTION		DETAIL
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PRECAST ARCHITECTURAL CONCRETE		ALTERNATE #1: HILLSBORO ST PARKING	
03-45A	PRECAST WHEEL STOP		F5/L-702
10 SPECIALTIES			
10-14A	ACCESSIBLE PARKING SIGN		E6/L-705
12 FURNISHINGS			
12-93--A	SITE FURNISHING, BACKED BENCH, N.I.C.		D6/L-702
12-93--B	SITE FURNISHING, BOLLARD	ALTERNATE #1: HILLSBORO ST PARKING	D1/L-703
12-93--C	SITE FURNISHING, BOLLARD, REMOVABLE		D3/L-703
12-93--D	SITE FURNISHING, BIKE RACK, N.I.C.		D4/L-702
12-93--E	SITE FURNISHING, TRASH RECEPTACLE, N.I.C.		A5/L-705
12-93F	SITE FURNISHINGS, FLAGPOLE		C6/L-706
26 ELECTRICAL			
26-56--A	EXTERIOR LIGHTING, PEDESTRIAN LIGHT POLE		/
32 EXTERIOR IMPROVEMENTS		ALTERNATE #4: CROSS CREEK TRAILS	
	ASPHALT PAVING, LIGHT DUTY		A3/L-701
	ASPHALT PAVING, HEAVY DUTY		A1/L-701
RIGID PAVING		ALTERNATE #1: HILLSBORO ST PARKING	
	CONCRETE PAVING, MEDIUM DUTY		D6/L-701
	CONCRETE PAVING - MEDIUM DUTY (SPECIALTY FINISH)		D6/L-701
32-13E	CURB RAMP		A5/L-706
CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS			
32-16--C	COMBINED CONCRETE CURBAND GUTTER (REF: CIVIL DWGS.)		
32-16--D	CONCRETE CURB, VERITCAL		/
32-16--F	CONCRETE CURB, FLUSH		B1/L-701
PAVING SPECIALTIES			
	PAVING SPECIALTIES, TACTILE WARNING SURFACING		A5/L-702

North Carolina Veterans Park Phase II

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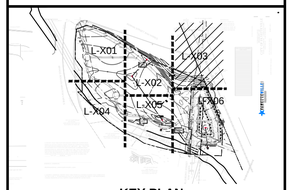
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Raleigh, NC 27603



KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

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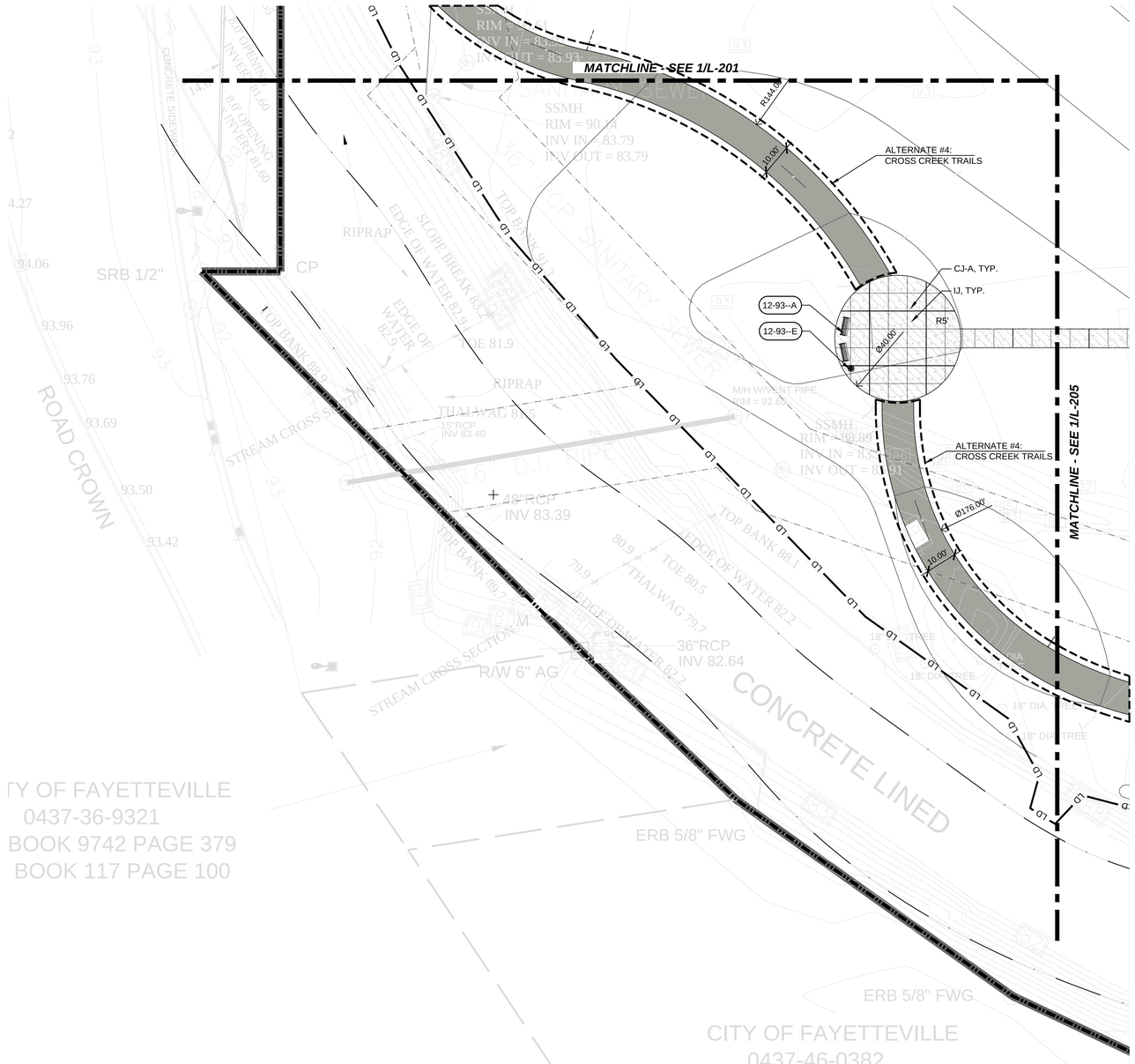
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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-203



TY OF FAYETTEVILLE
0437-36-9321
BOOK 9742 PAGE 379
BOOK 117 PAGE 100

RAWN UNDER MY SUPERVISION

CITY OF FAYETTEVILLE
0437-46-0382
DEED BOOK 9742 PAGE 379
PLAT BOOK 117 PAGE 100

01 L-204 Site Features Plan
SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

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03-45A	PRECAST WHEEL STOP		F5/L-702
10 SPECIALTIES			
10-14A	ACCESSIBLE PARKING SIGN		E6/L-705
12 FURNISHINGS			
12-93--A	SITE FURNISHING, BACKED BENCH, N.I.C.	ALTERNATE #1: HILLSBORO ST PARKING	D6/L-702
12-93--B	SITE FURNISHING, BOLLARD		D1/L-703
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26 ELECTRICAL			
26-56--A	EXTERIOR LIGHTING, PEDESTRIAN LIGHT POLE		/
32 EXTERIOR IMPROVEMENTS		ALTERNATE #4: CROSS CREEK TRAILS	
	ASPHALT PAVING, LIGHT DUTY		A3/L-701
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PAVING SPECIALTIES			
	PAVING SPECIALTIES, TACTILE WARNING SURFACING		A5/L-702

North Carolina Veterans Park Phase II

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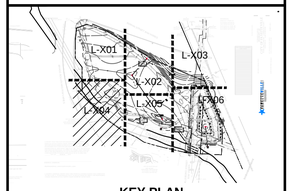
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KEY PLAN

SEAL | DATE 07/24/26

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REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

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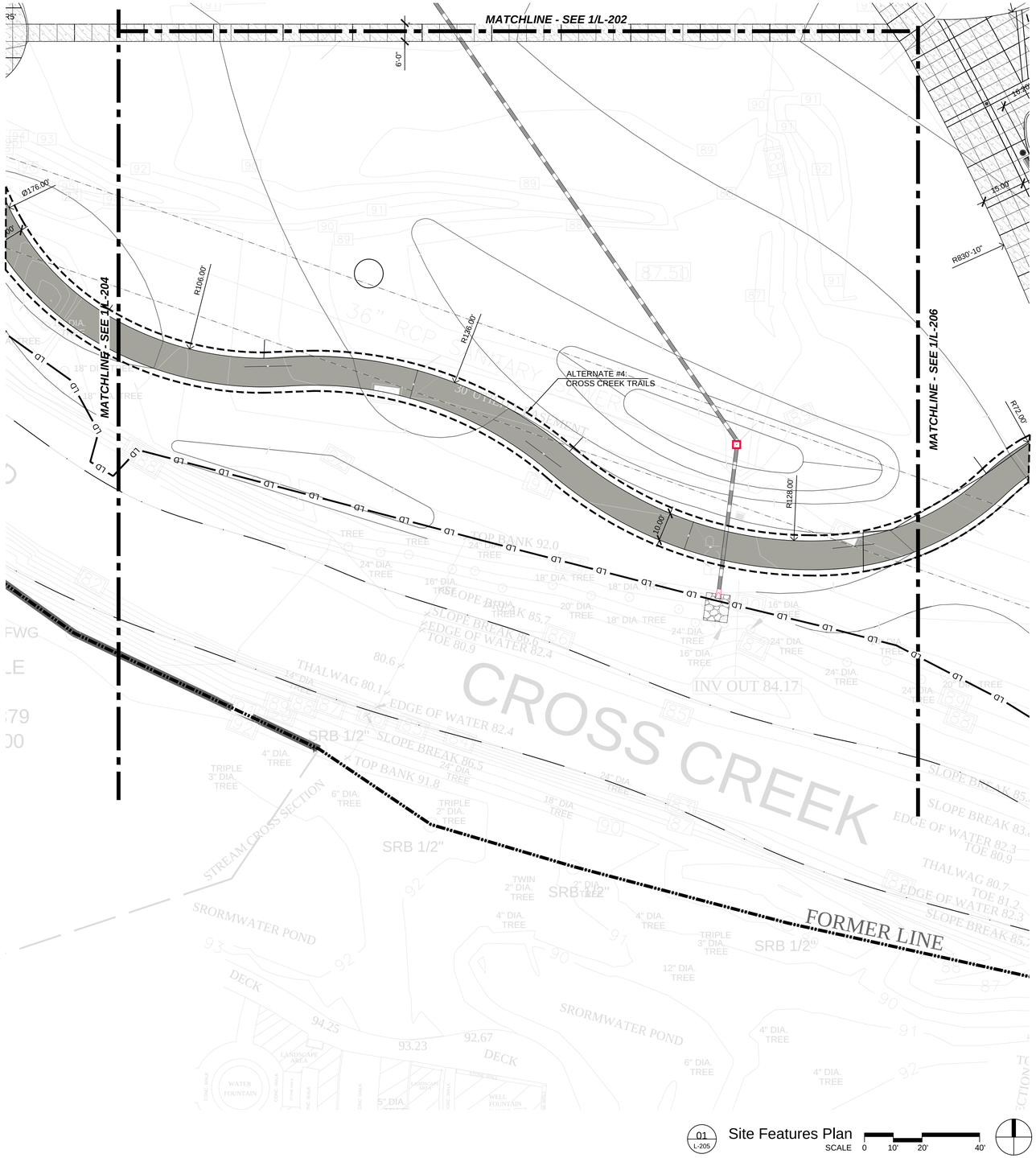
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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-204



01 L-205 Site Features Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

1. DO NOT SCALE DRAWINGS FOR FIELD LAYOUT. REFER TO SITE LAYOUT PLAN(S) FOR DIMENSIONS.
2. WORK SHOWN ON THE DRAWINGS SHALL BE BASE BID UNLESS SPECIFICALLY NOTED TO BE BY ALTERNATE BID.
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REFERENCE NOTES SCHEDULE

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12 FURNISHINGS			
12-93--A	SITE FURNISHING, BACKED BENCH, N.I.C.		D6/L-702
12-93--B	SITE FURNISHING, BOLLARD	ALTERNATE #1: HILLSBORO ST PARKING	D1/L-703
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32 EXTERIOR IMPROVEMENTS		ALTERNATE #4: CROSS CREEK TRAILS	
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	PAVING SPECIALTIES, TACTILE WARNING SURFACING		A5/L-702

North Carolina Veterans Park Phase II

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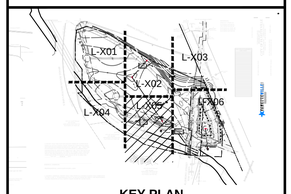
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KEY PLAN

SEAL | DATE 07/24/26

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2138
NORTH CAROLINA

SHEET ISSUE

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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-205



01 L-206 Site Features Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE FEATURES PLANS:

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12 FURNISHINGS			
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26 ELECTRICAL			
26-56--A	EXTERIOR LIGHTING, PEDESTRIAN LIGHT POLE		/
32 EXTERIOR IMPROVEMENTS		ALTERNATE #4: CROSS CREEK TRAILS	
	ASPHALT PAVING, LIGHT DUTY		A3/L-701
	ASPHALT PAVING, HEAVY DUTY		A1/L-701
RIGID PAVING		ALTERNATE #1: HILLSBORO ST PARKING	
	CONCRETE PAVING, MEDIUM DUTY		D6/L-701
	CONCRETE PAVING - MEDIUM DUTY (SPECIALTY FINISH)		D6/L-701
32-13E	CURB RAMP		A5/L-706
CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS			
32-16--C	COMBINED CONCRETE CURBAND GUTTER (REF: CIVIL DWGS.)		
32-16--D	CONCRETE CURB, VERITCAL		/
32-16--F	CONCRETE CURB, FLUSH		B1/L-701
PAVING SPECIALTIES			
	PAVING SPECIALTIES, TACTILE WARNING SURFACING		A5/L-702

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

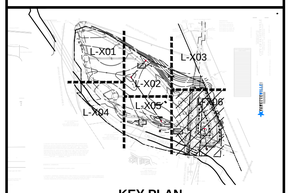
Owner
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121 Lamon Street
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Durham, NC 27707

Electrical Engineer
The Wooten Company
120 North Boylan Avenue
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KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	REVISED BID SET	07/24/26

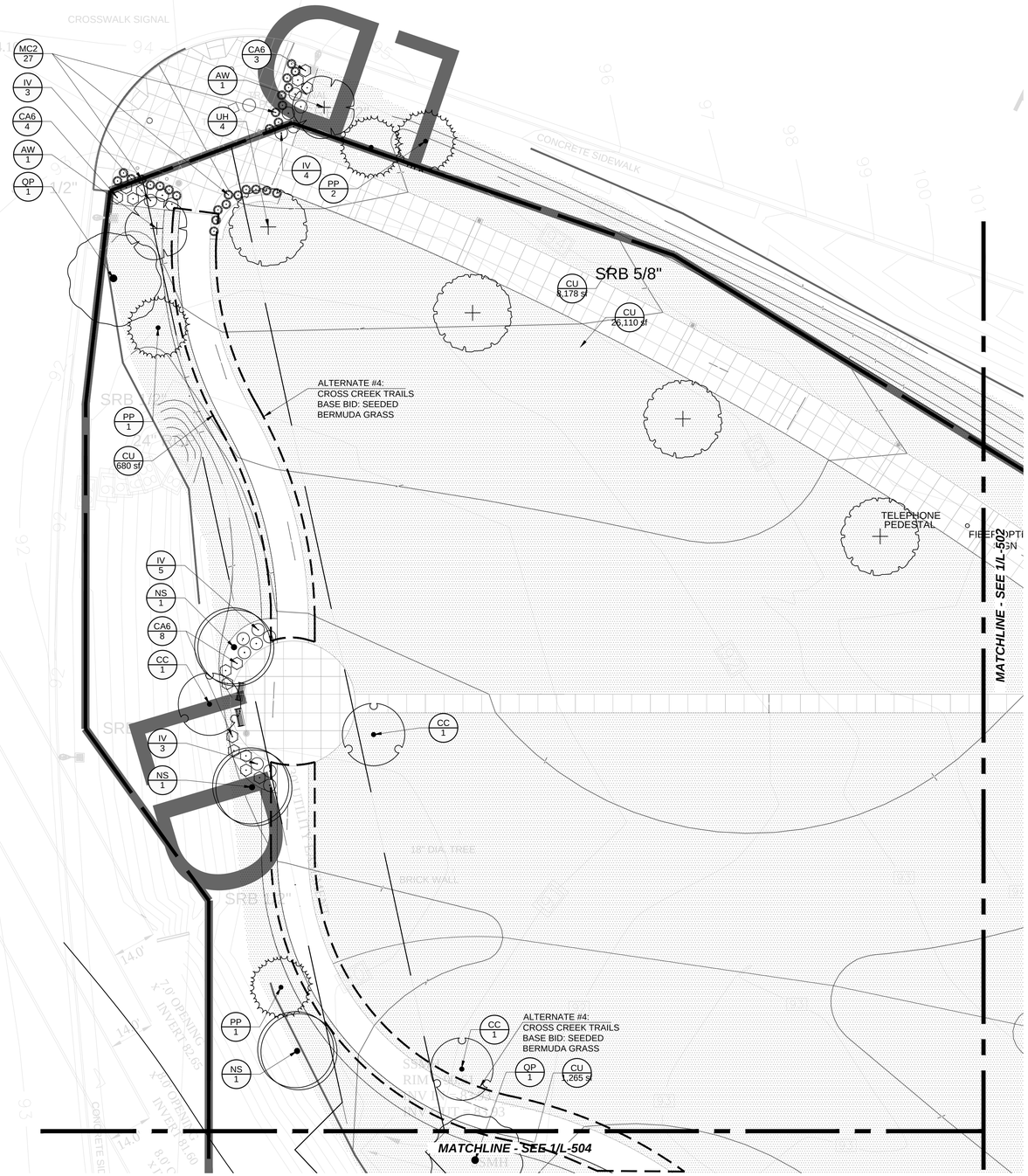
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PROJECT NO. 19097.000

SHEET TITLE
SITE FEATURES PLAN

SHEET NUMBER
L-206



01 L-501 Planting Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
2. MATCH GRAPHIC REPRESENTATION SHOWN UNLESS NOTED / DIMENSIONED OTHERWISE.
3. EXISTING AND PROPOSED UTILITIES THAT ARE SHOWN ARE FOR REFERENCE ONLY. REFER TO THE SITE SURVEY FOR EXISTING UTILITIES AND VERIFY IN THE FIELD. REFER TO THE SITE ELECTRICAL PLAN FOR PROPOSED LIGHTING AND OUTLETS.
4. COMMENCEMENT OF PLANTING SCOPE CONSTITUTES ACCEPTANCE OF SITE CONDITIONS. ENSURE THAT NECESSARY AND SPECIFIED PLANTING CONDITIONS HAVE BEEN ACHIEVED PRIOR TO LANDSCAPE INSTALLATION.
5. FOR DISTURBED AREAS WITHIN OR IMMEDIATELY ADJACENT TO RIGHT-OF-WAY, INSTALL SPECIFIED TURFGRASS SEED AT DISTURBED AREAS NOT OTHERWISE IDENTIFIED FOR PLANT MATERIAL. IF DISTURBED AREA WAS PREVIOUSLY A PLANTED AREA, RESTORE BY FINISH GRADING AND INSTALLING 2" DEPTH ORGANIC MULCH FOR DISTURBED AREA.
5. INSTALL SPECIFIED TURFGRASS SEED AT DISTURBED AREAS NOT OTHERWISE IDENTIFIED FOR PLANT MATERIAL.
6. PROVIDE MINIMUM 3" ORGANIC MULCH AT ALL PLANTING AREAS.
7. PROPOSED TREES, GROUNDCOVERS, GRASSES AND PERENNIALS SHALL BE INSTALLED PER /L704 UNLESS OTHERWISE INDICATED ON PLANS.
8. INTERPLANT BULBS BETWEEN CONTAINER STOCK. CONFIRM FINAL BULB LAYOUT WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	CAL.	HGT.	TYPE / SIZE	QTY
TREES						
	AW	Acer truncatum 'Main Street' / Main Street Maple	B&B	2" Cal.		11
	CC	Cercis canadensis / Eastern Redbud	Multi-Stem		7`-8`	6
	NS	Nyssa sylvatica / Tupelo	B&B	3" Cal.		8
	PP	Pinus palustris / Longleaf Pine	B&B	3" Cal.		13
	QP	Quercus phellos / Willow Oak	B&B	3" Cal.		13
	UH	Ulmus x `Patriot` / Patriot Elm	B&B	3" Cal.		11

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONTAINER SIZE	HEIGHT @ PLANTING	ROOTBALL	QTY
SHRUBS						
	CA6	Callicarpa americana / American Beautyberry	3 Gal.			26
	FB	Fothergilla gardenii 'Blue Mist' / Blue Mist Fothergilla	3 Gal.			22
	IV	Ilex vomitoria / Yaupon Holly	3 Gal.			55
GRASSES						
	MC2	Muhlenbergia capillaris / Pink Muhly Grass	1 Gal.			27

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	QTY
SEEDED				
	CU	Cynodon dactylon / Bermuda Grass	Seed	246,119 sf

CONCEPT PLANT SCHEDULE

PLANT COMBINATION 1		750 sf
	Allium x 'Purple Sensation' / Purple Sensation Ornamental Onion	389
	Clinopodium carolinianum / Georgia Calamint	59
	Echinacea pallida / Pale Purple Coneflower	39
	Muhlenbergia capillaris / Pink Muhly Grass	48
	Sporobolus heterolepis / Prairie Dropseed	48
PLANT COMBINATION 2		804 sf
	Asclepias tuberosa / Butterfly Milkweed	42
	Deschampsia cespitosa / Tufted Hair Grass	63
	Leucanthemum x superbum / Shasta Daisy	19
	Sisyrinchium angustifolium / Narrowleaf Blue-eyed Grass	63
SEDGE MIX		3,320 sf
	Achillea millefolium / Common Yarrow	830 sf
	Carex flacca / Blue Sedge	1,660 sf
	Eragrostis pectinacea / Tufted Lovegrass	830 sf

North Carolina Veterans Park Phase II

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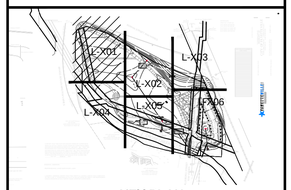
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KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH 2138 REGISTERED LANDSCAPE ARCHITECT NORTH CAROLINA

SHEET ISSUE

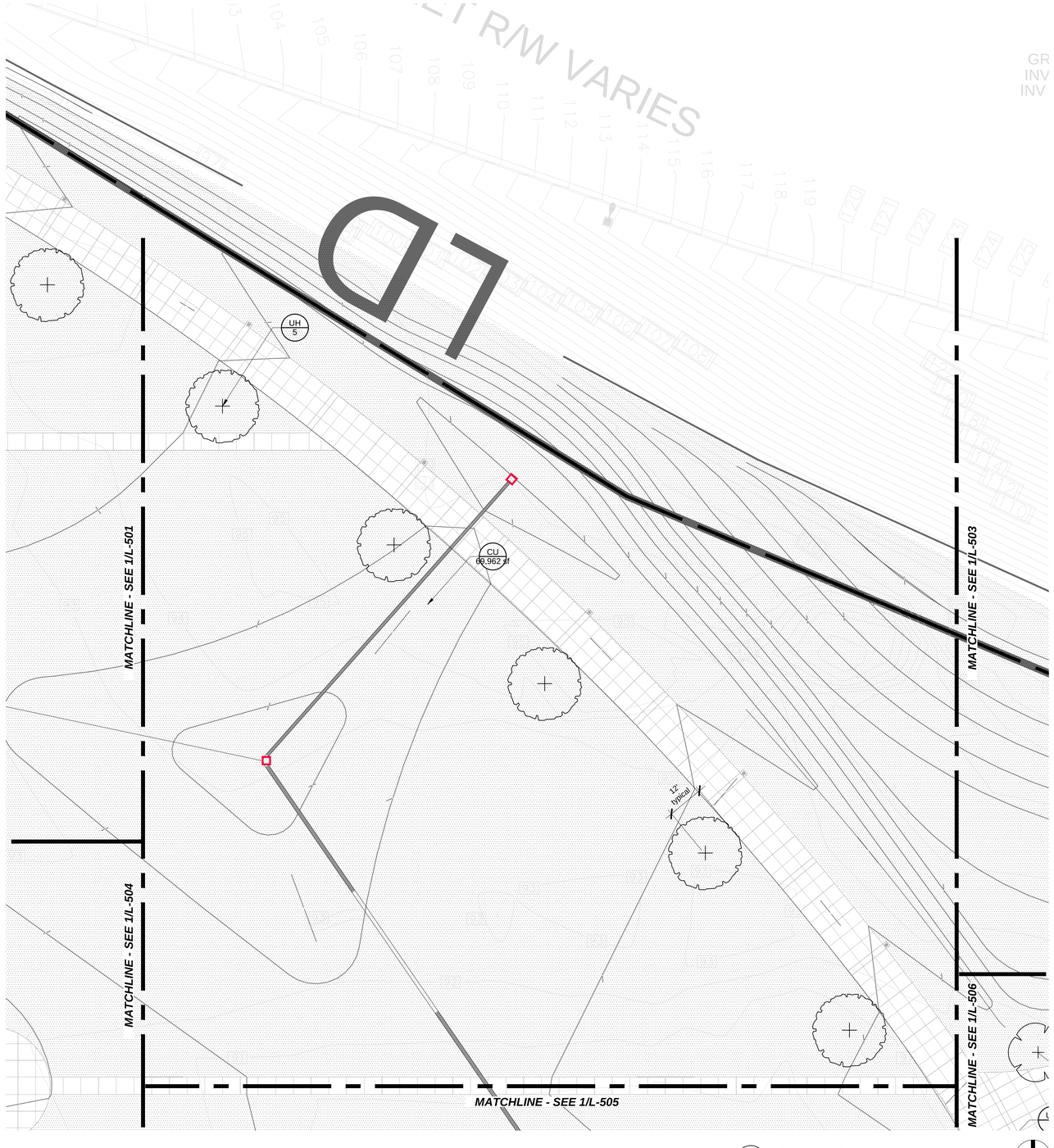
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-501



01 L-502 Planting Plan
SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
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8. INTERPLANT BULBS BETWEEN CONTAINER STOCK. CONFIRM FINAL BULB LAYOUT WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	CAL.	HGT.	TYPE / SIZE	QTY
TREES						
	AW	Acer truncatum 'Main Street' / Main Street Maple	B&B	2" Cal.		11
	CC	Cercis canadensis / Eastern Redbud	Multi-Stem		7`-8`	6
	NS	Nyssa sylvatica / Tupelo	B&B	3" Cal.		8
	PP	Pinus palustris / Longleaf Pine	B&B	3" Cal.		13
	QP	Quercus phellos / Willow Oak	B&B	3" Cal.		13
	UH	Ulmus x `Patriot` / Patriot Elm	B&B	3" Cal.		11

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONTAINER SIZE	HEIGHT @ PLANTING	ROOTBALL	QTY
SHRUBS						
	CA6	Callicarpa americana / American Beautyberry	3 Gal.			26
	FB	Fothergilla gardenii 'Blue Mist' / Blue Mist Fothergilla	3 Gal.			22
	IV	Ilex vomitoria / Yaupon Holly	3 Gal.			55
GRASSES						
	MC2	Muhlenbergia capillaris / Pink Muhly Grass	1 Gal.			27

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	QTY
SEEDED				
	CU	Cynodon dactylon / Bermuda Grass	Seed	246,119 sf

CONCEPT PLANT SCHEDULE

PLANT COMBINATION 1		750 sf
	Allium x 'Purple Sensation' / Purple Sensation Ornamental Onion	389
	Clinopodium carolinianum / Georgia Calamint	59
	Echinacea pallida / Pale Purple Coneflower	39
	Muhlenbergia capillaris / Pink Muhly Grass	48
	Sporobolus heterolepis / Prairie Dropseed	48
PLANT COMBINATION 2		804 sf
	Asclepias tuberosa / Butterfly Milkweed	42
	Deschampsia cespitosa / Tufted Hair Grass	63
	Leucanthemum x superbum / Shasta Daisy	19
	Sisyrinchium angustifolium / Narrowleaf Blue-eyed Grass	63
SEDGE MIX		3,320 sf
	Achillea millefolium / Common Yarrow	830 sf
	Carex flacca / Blue Sedge	1,660 sf
	Eragrostis pectinacea / Tufted Lovegrass	830 sf

North Carolina Veterans Park Phase II

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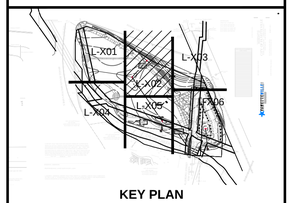
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Electrical Engineer
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120 North Boylan Avenue
Raleigh, NC 27603



KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH REGISTERED LANDSCAPE ARCHITECT 2138 NORTH CAROLINA

SHEET ISSUE

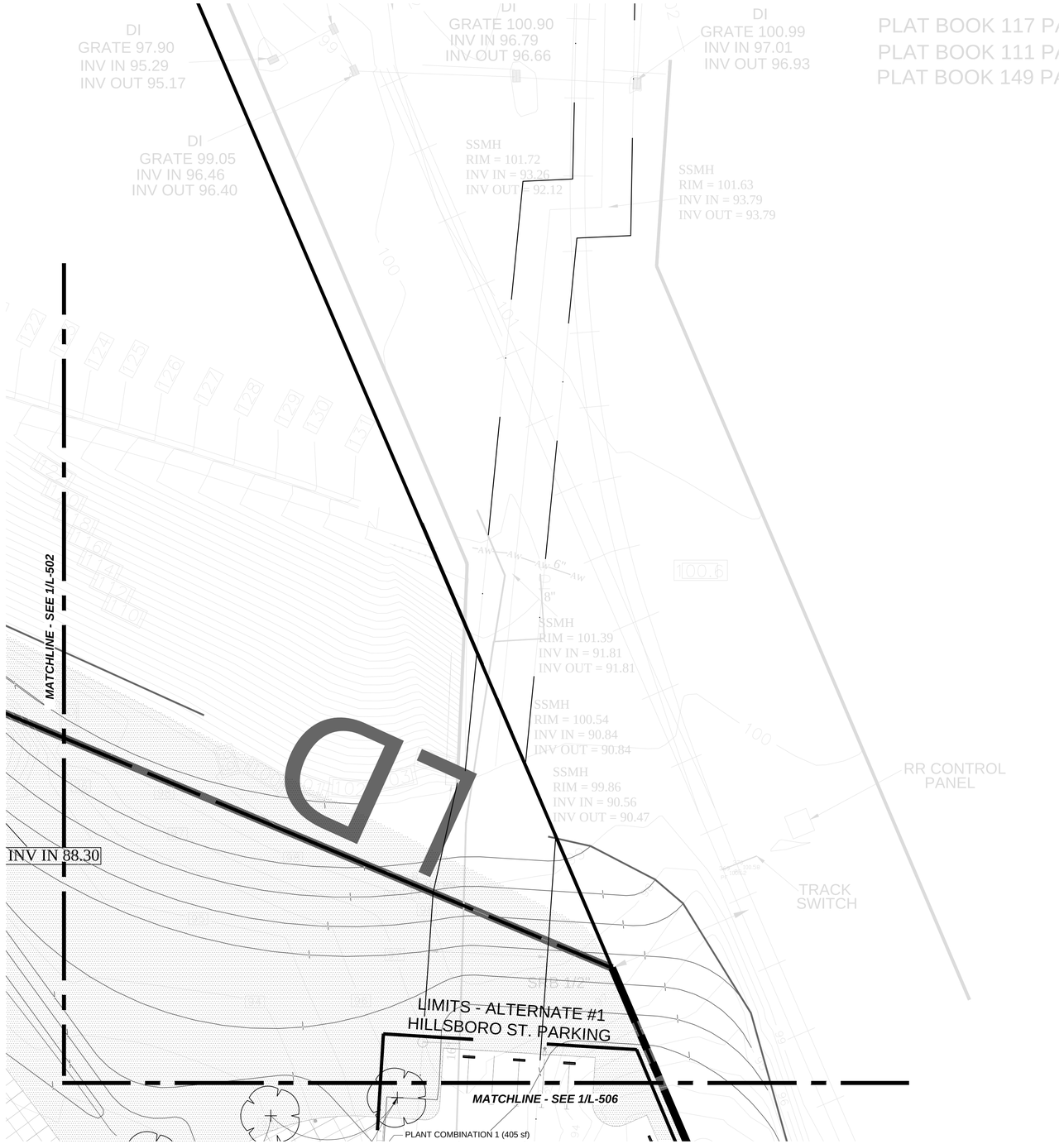
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-502



01 L-503 Planting Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
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6. PROVIDE MINIMUM 3" ORGANIC MULCH AT ALL PLANTING AREAS.
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8. INTERPLANT BULBS BETWEEN CONTAINER STOCK. CONFIRM FINAL BULB LAYOUT WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	CAL.	HGT.	TYPE / SIZE	QTY
TREES						
	AW	Acer truncatum 'Main Street' / Main Street Maple	B&B	2" Cal.		11
	CC	Cercis canadensis / Eastern Redbud	Multi-Stem		7`-8`	6
	NS	Nyssa sylvatica / Tupelo	B&B	3" Cal.		8
	PP	Pinus palustris / Longleaf Pine	B&B	3" Cal.		13
	QP	Quercus phellos / Willow Oak	B&B	3" Cal.		13
	UH	Ulmus x `Patriot` / Patriot Elm	B&B	3" Cal.		11

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONTAINER SIZE	HEIGHT @ PLANTING	ROOTBALL	QTY
SHRUBS						
	CA6	Callicarpa americana / American Beautyberry	3 Gal.			26
	FB	Fothergilla gardenii 'Blue Mist' / Blue Mist Fothergilla	3 Gal.			22
	IV	Ilex vomitoria / Yaupon Holly	3 Gal.			55
GRASSES						
	MC2	Muhlenbergia capillaris / Pink Muhly Grass	1 Gal.			27

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	QTY
SEEDED				
	CU	Cynodon dactylon / Bermuda Grass	Seed	246,119 sf

CONCEPT PLANT SCHEDULE

PLANT COMBINATION 1		750 sf
Allium x `Purple Sensation` / Purple Sensation Ornamental Onion		389
Clinopodium carolinianum / Georgia Calamint		59
Echinacea pallida / Pale Purple Coneflower		39
Muhlenbergia capillaris / Pink Muhly Grass		48
Sporobolus heterolepis / Prairie Dropseed		48
PLANT COMBINATION 2		804 sf
Asclepias tuberosa / Butterfly Milkweed		42
Deschampsia cespitosa / Tufted Hair Grass		63
Leucanthemum x superbum / Shasta Daisy		19
Sisyrinchium angustifolium / Narrowleaf Blue-eyed Grass		63
SEDGE MIX		3,320 sf
Achillea millefolium / Common Yarrow		830 sf
Carex flacca / Blue Sedge		1,660 sf
Eragrostis pectinacea / Tufted Lovegrass		830 sf

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

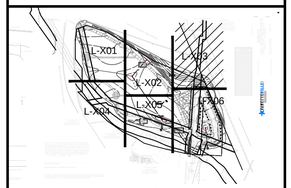
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KEY PLAN

SEAL | DATE 07/24/26

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2138
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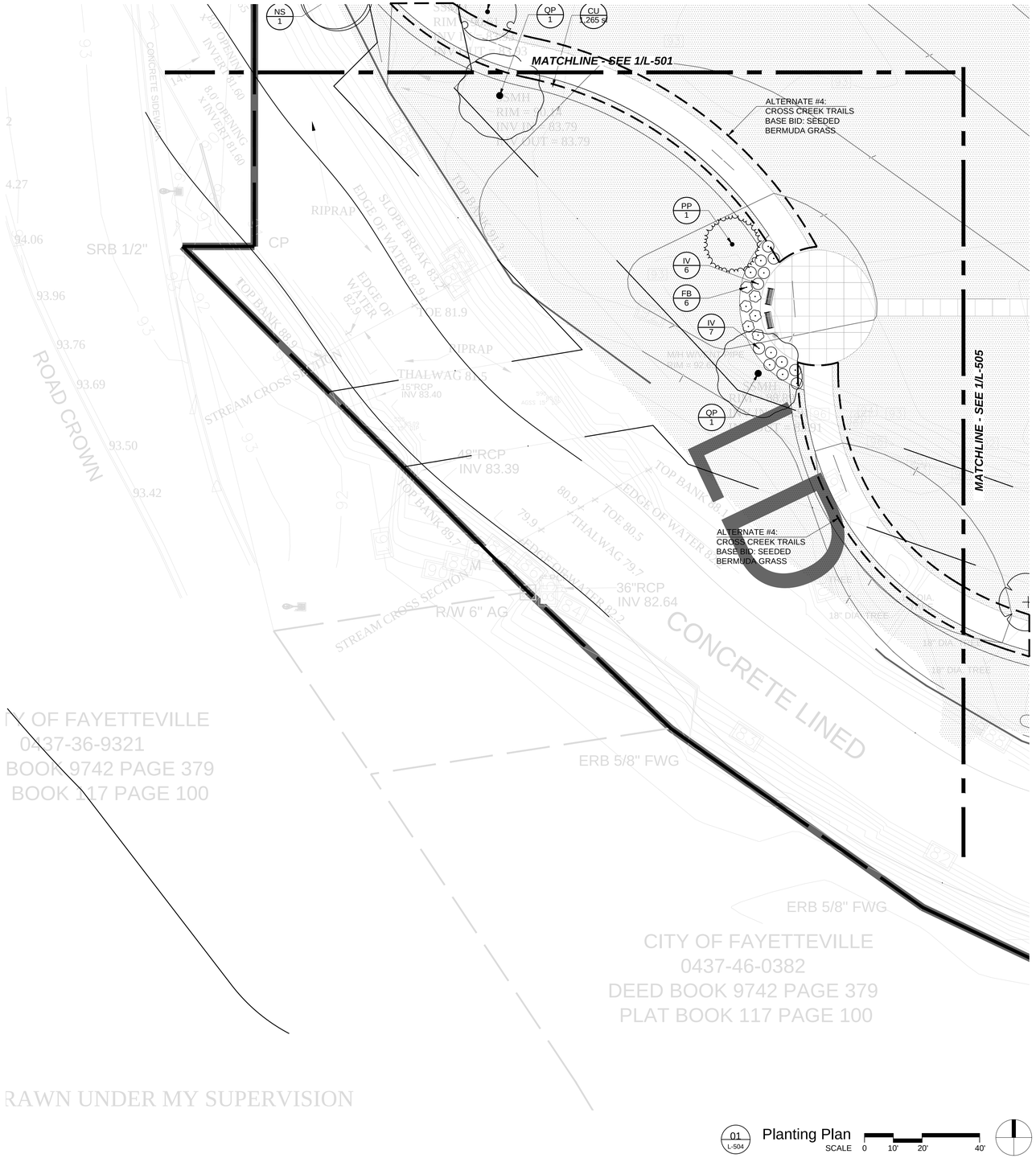
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-503



CITY OF FAYETTEVILLE
0437-36-9321
BOOK 9742 PAGE 379
BOOK 117 PAGE 100

CITY OF FAYETTEVILLE
0437-46-0382
DEED BOOK 9742 PAGE 379
PLAT BOOK 117 PAGE 100

RAWN UNDER MY SUPERVISION

01 L-504 Planting Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
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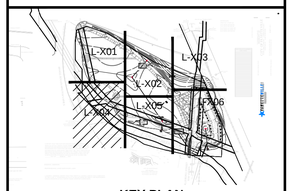
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SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	REVISED BID SET	07/24/26

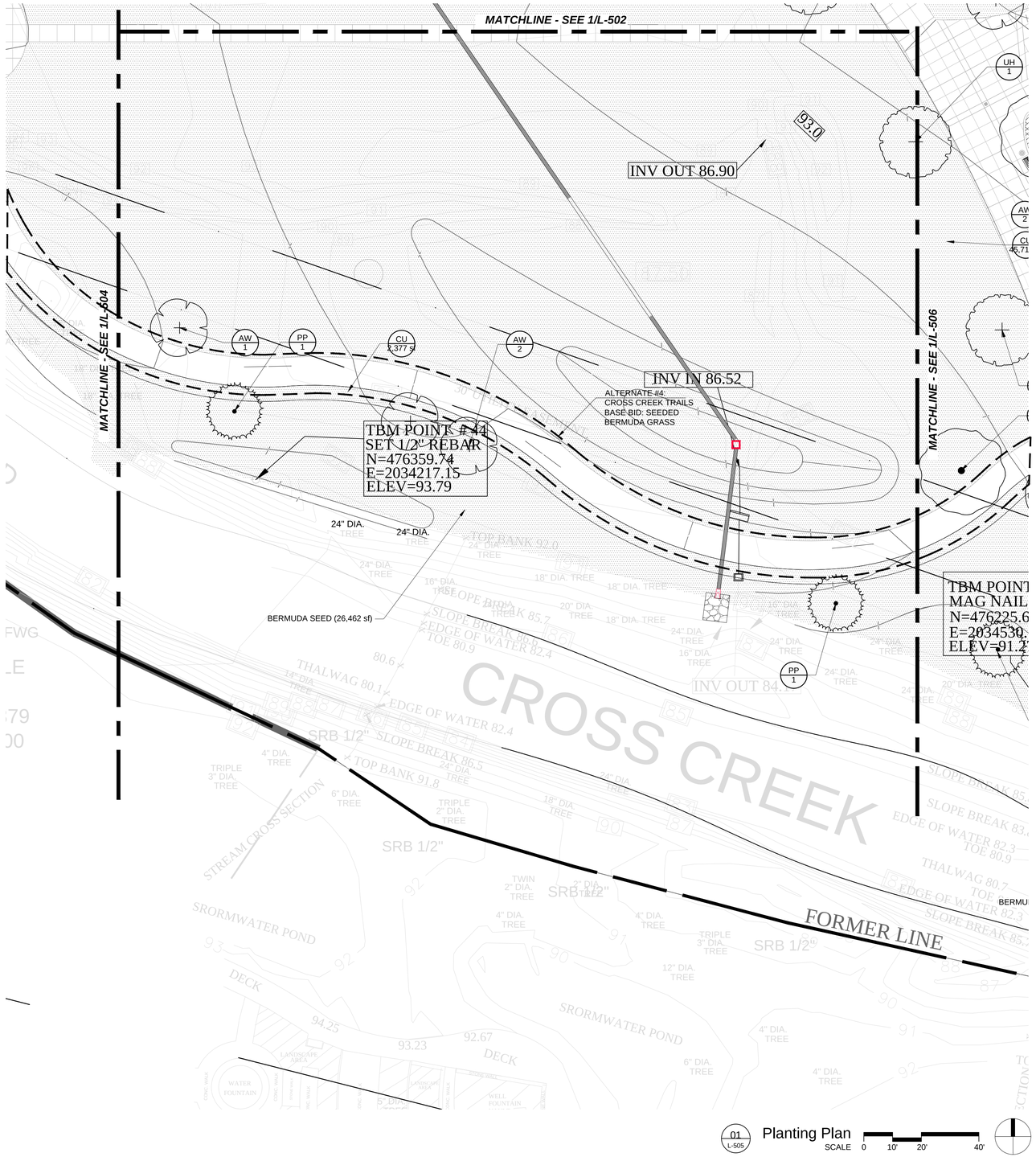
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-504



01 L-505 Planting Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
2. MATCH GRAPHIC REPRESENTATION SHOWN UNLESS NOTED / DIMENSIONED OTHERWISE.
3. EXISTING AND PROPOSED UTILITIES THAT ARE SHOWN ARE FOR REFERENCE ONLY. REFER TO THE SITE SURVEY FOR EXISTING UTILITIES AND VERIFY IN THE FIELD. REFER TO THE SITE ELECTRICAL PLAN FOR PROPOSED LIGHTING AND OUTLETS.
4. COMMENCEMENT OF PLANTING SCOPE CONSTITUTES ACCEPTANCE OF SITE CONDITIONS. ENSURE THAT NECESSARY AND SPECIFIED PLANTING CONDITIONS HAVE BEEN ACHIEVED PRIOR TO LANDSCAPE INSTALLATION.
5. FOR DISTURBED AREAS WITHIN OR IMMEDIATELY ADJACENT TO RIGHT-OF-WAY, INSTALL SPECIFIED TURFGRASS SEED AT DISTURBED AREAS NOT OTHERWISE IDENTIFIED FOR PLANT MATERIAL. IF DISTURBED AREA WAS PREVIOUSLY A PLANTED AREA, RESTORE BY FINISH GRADING AND INSTALLING 2" DEPTH ORGANIC MULCH FOR DISTURBED AREA.
5. INSTALL SPECIFIED TURFGRASS SEED AT DISTURBED AREAS NOT OTHERWISE IDENTIFIED FOR PLANT MATERIAL.
6. PROVIDE MINIMUM 3" ORGANIC MULCH AT ALL PLANTING AREAS.
7. PROPOSED TREES, GROUNDCOVERS, GRASSES AND PERENNIALS SHALL BE INSTALLED PER /L704 UNLESS OTHERWISE INDICATED ON PLANS.
8. INTERPLANT BULBS BETWEEN CONTAINER STOCK. CONFIRM FINAL BULB LAYOUT WITH LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.

PLANT SCHEDULE

SYMBOL	CODE	BOTANICAL / COMMON NAME	CAL.	HGT.	TYPE / SIZE	QTY
TREES						
	AW	Acer truncatum 'Main Street' / Main Street Maple	B&B	2" Cal.		11
	CC	Cercis canadensis / Eastern Redbud	Multi-Stem		7`-8`	6
	NS	Nyssa sylvatica / Tupelo	B&B	3" Cal.		8
	PP	Pinus palustris / Longleaf Pine	B&B	3" Cal.		13
	QP	Quercus phellos / Willow Oak	B&B	3" Cal.		13
	UH	Ulmus x `Patriot` / Patriot Elm	B&B	3" Cal.		11

SYMBOL	CODE	BOTANICAL / COMMON NAME	CONTAINER SIZE	HEIGHT @ PLANTING	ROOTBALL	QTY
SHRUBS						
	CA6	Callicarpa americana / American Beautyberry	3 Gal.			26
	FB	Fothergilla gardenii 'Blue Mist' / Blue Mist Fothergilla	3 Gal.			22
	IV	Ilex vomitoria / Yaupon Holly	3 Gal.			55
GRASSES						
	MC2	Muhlenbergia capillaris / Pink Muhly Grass	1 Gal.			27

SYMBOL	CODE	BOTANICAL / COMMON NAME	SIZE	QTY
SEEDED				
	CU	Cynodon dactylon / Bermuda Grass	Seed	246,119 sf

CONCEPT PLANT SCHEDULE

PLANT COMBINATION 1	750 sf
Allium x `Purple Sensation` / Purple Sensation Ornamental Onion	389
Clinopodium carolinianum / Georgia Calamint	59
Echinacea pallida / Pale Purple Coneflower	39
Muhlenbergia capillaris / Pink Muhly Grass	48
Sporobolus heterolepis / Prairie Dropseed	48
PLANT COMBINATION 2	804 sf
Asclepias tuberosa / Butterfly Milkweed	42
Deschampsia cespitosa / Tufted Hair Grass	63
Leucanthemum x superbum / Shasta Daisy	19
Sisyrinchium angustifolium / Narrowleaf Blue-eyed Grass	63
SEDGE MIX	3,320 sf
Achillea millefolium / Common Yarrow	830 sf
Carex flacca / Blue Sedge	1,660 sf
Eragrostis pectinacea / Tufted Lovegrass	830 sf

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

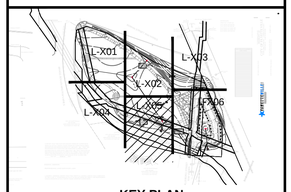
Owner
City of Fayetteville
121 Lamon Street
Fayetteville, NC 28301

Landscape Architect
RATIO
227 Fayetteville Street, Suite 301
Raleigh, North Carolina 27601
919-821-0805

Civil Engineer / Environmental
GFT Infrastructure, Inc.
1 Glenwood Ave., Suite 600
Raleigh, NC 27603

Water Resources
Tomo Engineering
2319 Cardinal Drive
Durham, NC 27707

Electrical Engineer
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603



KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

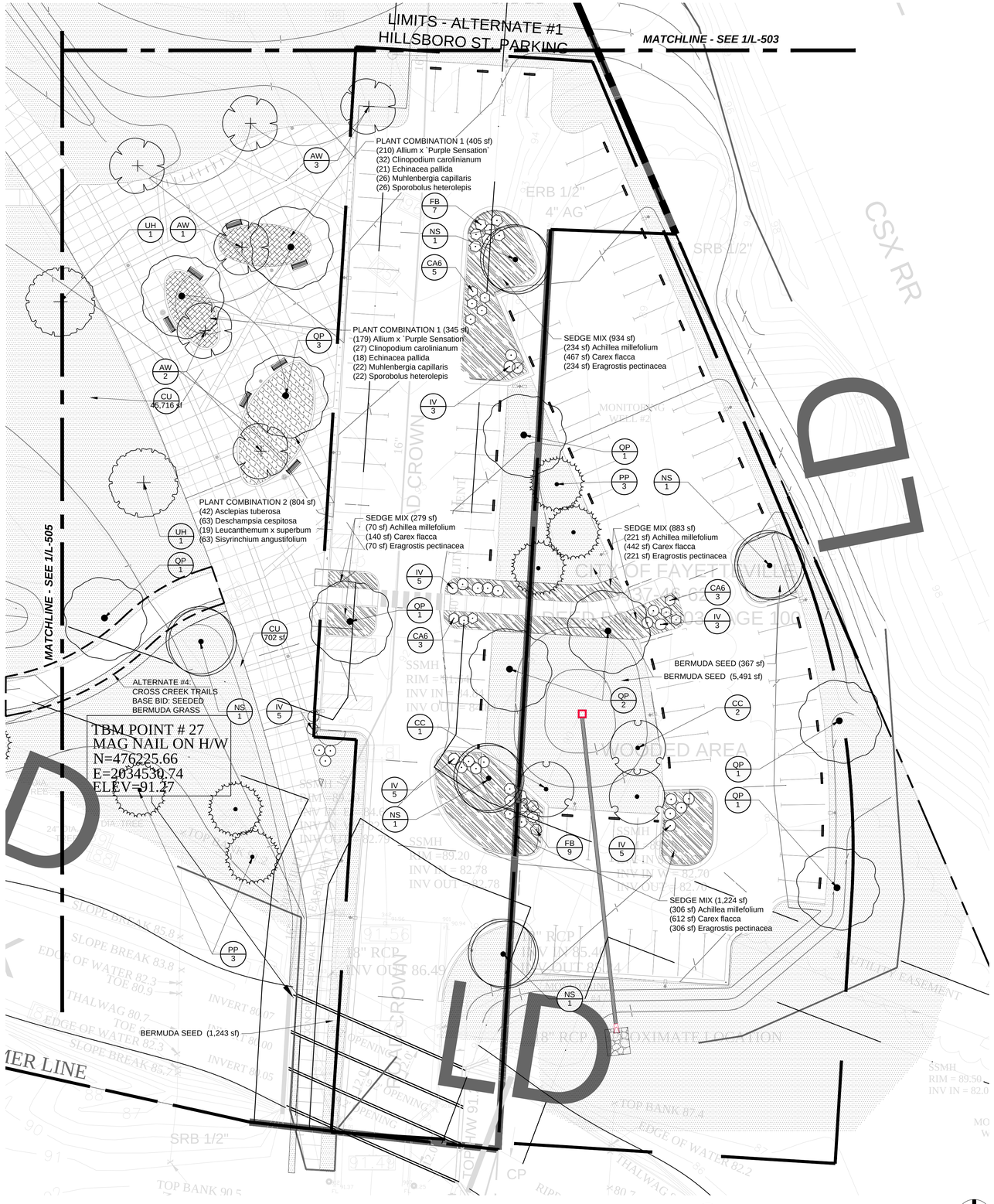
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-505



01 L-506 Planting Plan

SCALE 0 10' 20' 40'

GENERAL NOTES | SITE PLANTING PLANS:

1. PARTICIPATE IN THE PRE-INSTALLATION CONFERENCE FOR THE PLANTING SCOPE OF WORK, ACCORDING TO THE PROJECT SPECIFICATIONS, PRIOR TO COMMENCEMENT.
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4. COMMENCEMENT OF PLANTING SCOPE CONSTITUTES ACCEPTANCE OF SITE CONDITIONS. ENSURE THAT NECESSARY AND SPECIFIED PLANTING CONDITIONS HAVE BEEN ACHIEVED PRIOR TO LANDSCAPE INSTALLATION.
5. FOR DISTURBED AREAS WITHIN OR IMMEDIATELY ADJACENT TO RIGHT-OF-WAY, INSTALL SPECIFIED TURFGRASS SEED AT DISTURBED AREAS NOT OTHERWISE IDENTIFIED FOR PLANT MATERIAL. IF DISTURBED AREA WAS PREVIOUSLY A PLANTED AREA, RESTORE BY FINISH GRADING AND INSTALLING 2" DEPTH ORGANIC MULCH FOR DISTURBED AREA.
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PLANT SCHEDULE

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Sisyrinchium angustifolium / Narrowleaf Blue-eyed Grass		63
SEDGE MIX		3,320 sf
Achillea millefolium / Common Yarrow		830 sf
Carex flacca / Blue Sedge		1,660 sf
Eragrostis pectinacea / Tufted Lovegrass		830 sf

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

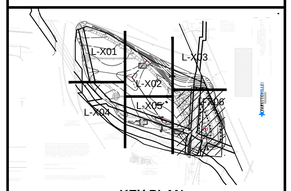
Owner
City of Fayetteville
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Fayetteville, NC 28301

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227 Fayetteville Street, Suite 301
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REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

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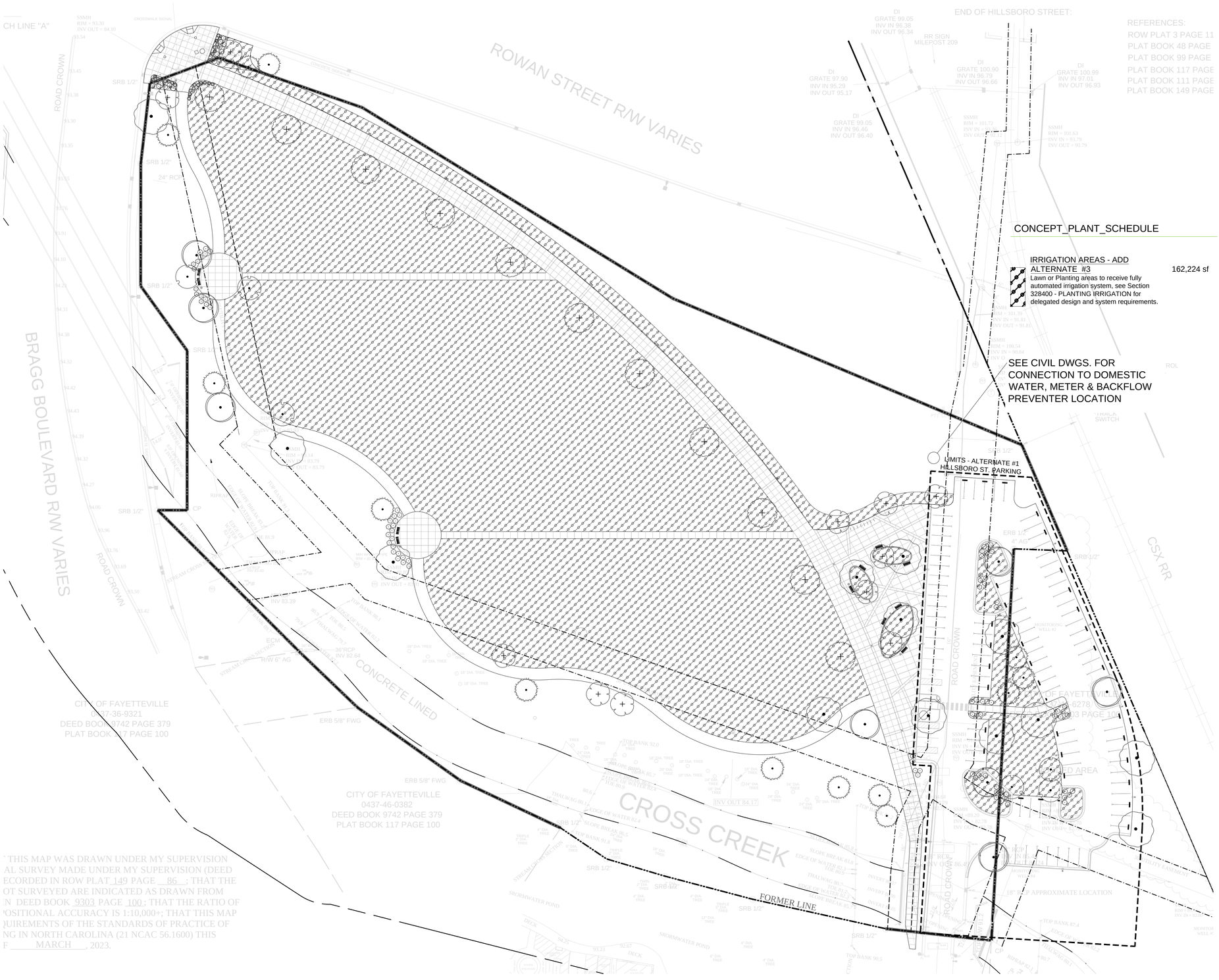
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PROJECT NO. 19097.000

SHEET TITLE
PLANTING PLAN

SHEET NUMBER
L-506



01 L-601 Irrigation Plan Diagram

SCALE 0 20' 40' 80'

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

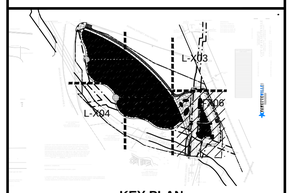
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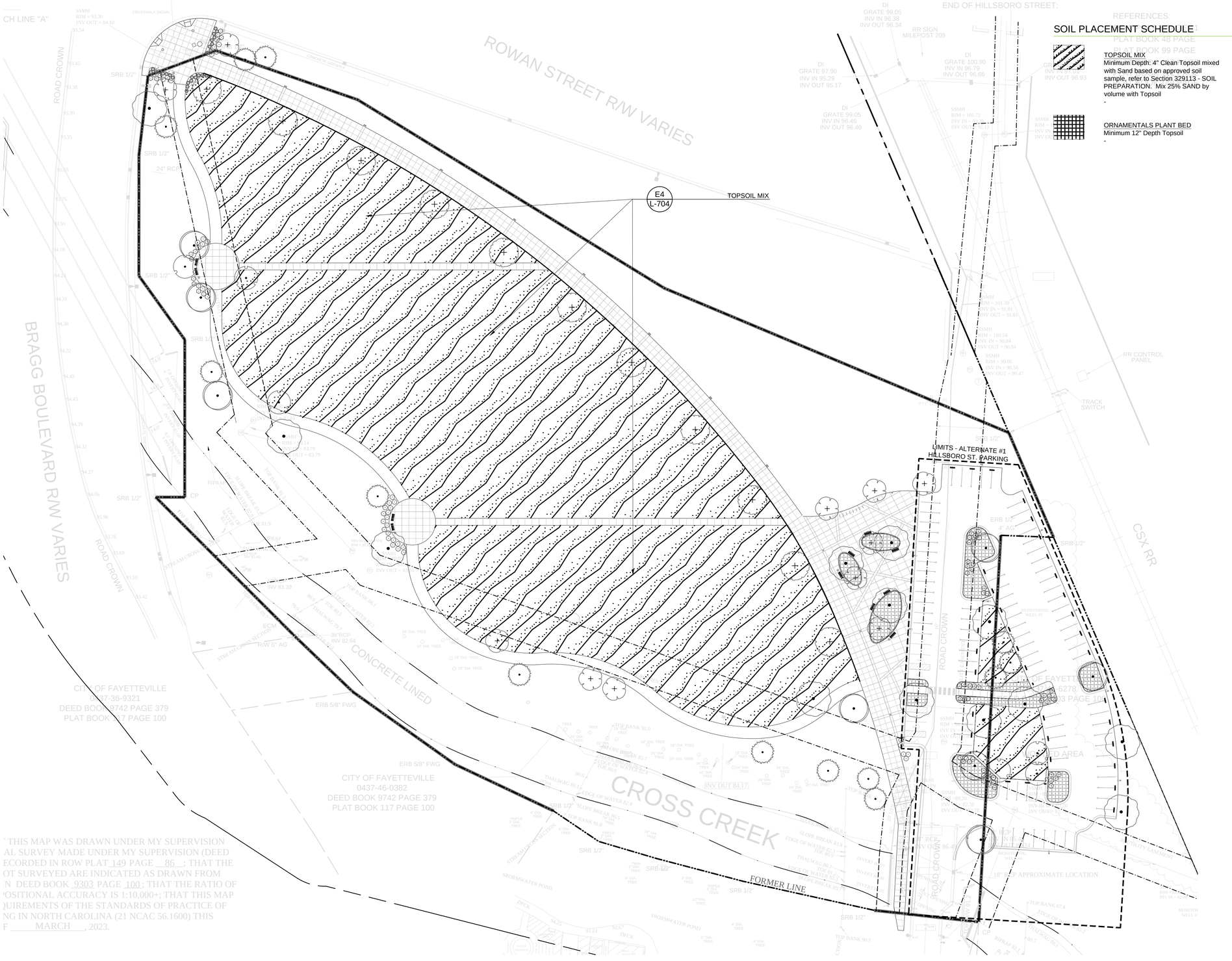
PROJECT NO. 19097.000

SHEET TITLE

IRRIGATION PLAN DIAGRAM

SHEET NUMBER

L-601



SOIL PLACEMENT SCHEDULE

TOPSOIL MIX
Minimum Depth: 4" Clean Topsoil mixed with Sand based on approved soil sample, refer to Section 329113 - SOIL PREPARATION. Mix 25% SAND by volume with Topsoil
-

ORNAMENTALS PLANT BED
Minimum 12" Depth Topsoil
-

01 L-602 SOIL PLACEMENT PLAN

SCALE 0 20' 40' 80'

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

Owner
City of Fayetteville
121 Lamon Street
Fayetteville, NC 28301

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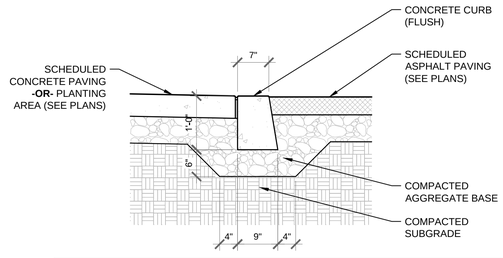
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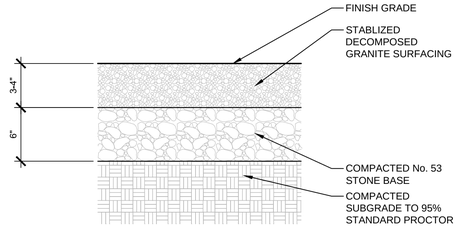
SHEET TITLE
SOIL PLACEMENT PLAN

SHEET NUMBER
L-602

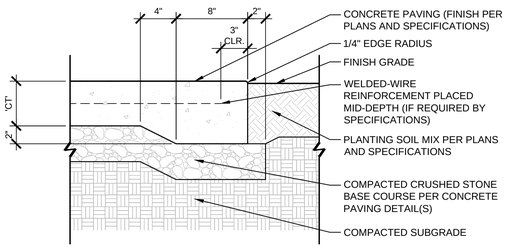


NOTES:
1. SEE [CONCRETE PAVING GENERAL NOTES] AND DIVISION 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. CONCRETE CURBS SHALL HAVE SAWCUT CONTRACTION JOINTS (1" DEPTH) LOCATED 10'-0" O.C., UNLESS NOTED OTHERWISE.

B1 CONCRETE CURB (FLUSH)
L-701 — 3/4" = 1'-0" — P-NCV-31

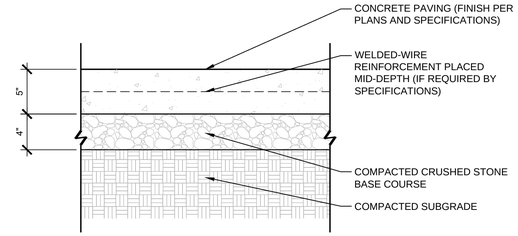


D3 AGGREGATE SURFACE PAVING
L-701 — 1 1/2" = 1'-0" — P-NCV-45



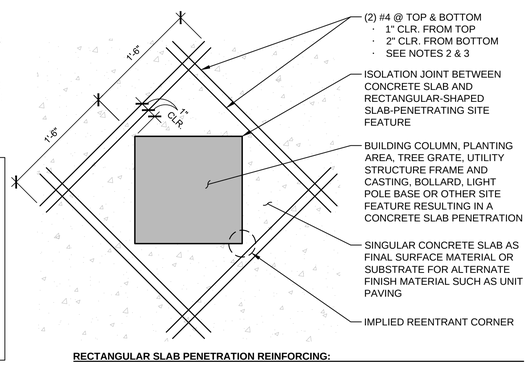
NOTES:
1. SEE DIVISIONS 31 AND 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. COMPLY WITH PRIMARY CONCRETE PAVING SECTION DETAILS AS IDENTIFIED ON PLANS.
3. 'CT' = NOMINAL CONCRETE PAVING THICKNESS.
4. **CONCRETE PAVING JOINTS:** SEE PLANS FOR JOINT TYPES AND LOCATIONS. SEE XX/00 FOR JOINT DETAILS.
5. **REENTRANT CORNERS:** ALL REENTRANT CORNERS SHALL BE REINFORCED. SEE XX/00 FOR REENTRANT CORNER REINFORCING DETAILS.
6. **PIPE PENETRATIONS:** ALL PIPE PENETRATIONS SHALL BE REINFORCED. SEE XX/00 FOR PIPE PENETRATION REINFORCING DETAILS.

B3 SECTION | CONCRETE PAVING (EDGE TRANSITION)
L-701 — 1 1/2" = 1'-0" — P-NCV-04

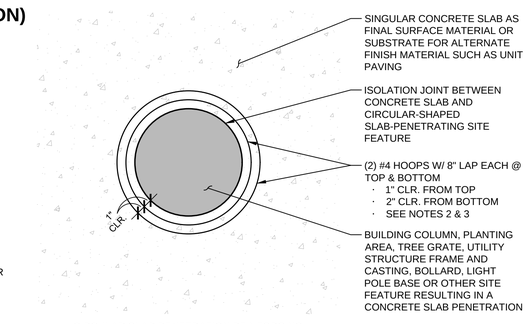


NOTES:
1. SEE DIVISIONS 31 AND 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. **CONCRETE PAVING JOINTS:** SEE PLANS FOR JOINT TYPES AND LOCATIONS. SEE A6/L-701 FOR JOINT DETAILS.
3. **REENTRANT CORNERS:** ALL REENTRANT CORNERS SHALL BE REINFORCED. SEE A4/L-701 FOR REENTRANT CORNER REINFORCING DETAILS.
4. **PIPE PENETRATIONS:** ALL PIPE PENETRATIONS SHALL BE REINFORCED. SEE A4/L-701 FOR PIPE PENETRATION REINFORCING DETAILS.

D4 SECTION | CONCRETE PAVING (LIGHT DUTY)
L-701 — 1 1/2" = 1'-0" — P-NCV-02



RECTANGULAR SLAB PENETRATION REINFORCING:

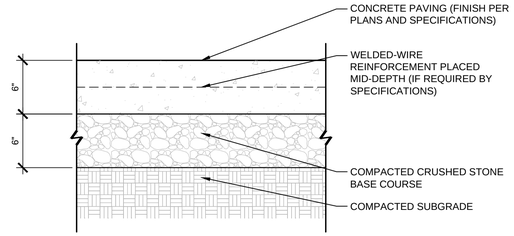


CIRCULAR SLAB PENETRATION REINFORCING:

NOTES:
1. SEE DIVISION 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. DO NOT LET REINFORCEMENT CROSS SAWCUTS NEARBY OR OTHER JOINTS THAT ALLOW FOR MOVEMENT.
3. BOTTOM REINFORCEMENT IS REQUIRED ONLY FOR SLABS GREATER THAN OR EQUAL TO 6-INCHES IN DEPTH. TOP REINFORCEMENT IS REQUIRED AT ALL INSTANCES.

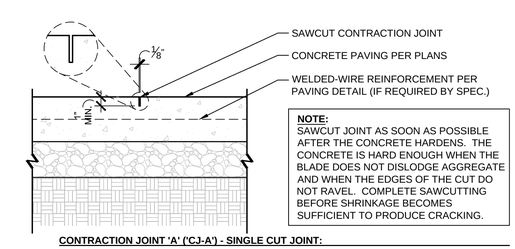
SLAB PENETRATIONS

A4 PLAN DETAIL | CONCRETE PAVING REINFORCING
L-701 — 1 1/2" = 1'-0" — P-NCV-06



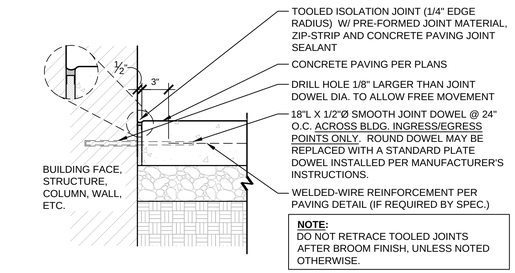
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3. **REENTRANT CORNERS:** ALL REENTRANT CORNERS SHALL BE REINFORCED. SEE A4/L-701 FOR REENTRANT CORNER REINFORCING DETAILS.
4. **PIPE PENETRATIONS:** ALL PIPE PENETRATIONS SHALL BE REINFORCED. SEE A4/L-701 FOR PIPE PENETRATION REINFORCING DETAILS.

D6 SECTION | CONCRETE PAVING (MEDIUM DUTY)
L-701 — 1 1/2" = 1'-0" — P-NCV-41



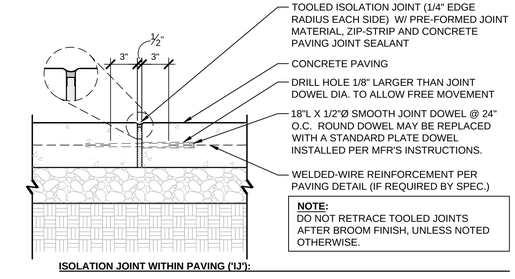
NOTE:
SAWCUT JOINT AS SOON AS POSSIBLE AFTER THE CONCRETE HARDENS. THE CONCRETE IS HARD ENOUGH WHEN THE BLADE DOES NOT DISLODGE AGGREGATE AND WHEN THE EDGES OF THE CUT DO NOT RAVEL. COMPLETE SAWCUTTING BEFORE SHRINKAGE BECOMES SUFFICIENT TO PRODUCE CRACKING.

CONTRACTION JOINT 'A' ('CJ-A') - SINGLE CUT JOINT:



NOTE:
DO NOT RETRACE TOOLED JOINTS AFTER BROOM FINISH, UNLESS NOTED OTHERWISE.

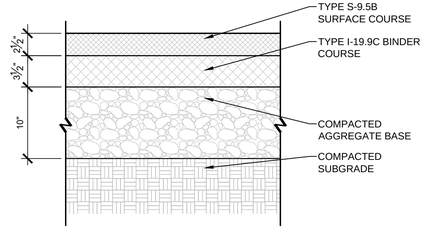
ISOLATION JOINT @ VERTICAL CONSTRUCTION:



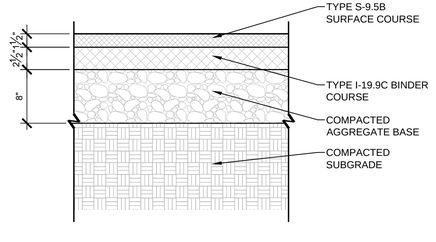
NOTE:
DO NOT RETRACE TOOLED JOINTS AFTER BROOM FINISH, UNLESS NOTED OTHERWISE.

ISOLATION JOINT WITHIN PAVING ('IJ'):

A6 SECTION | CONCRETE PAVING JOINTS
L-701 — 1 1/2" = 1'-0" — P-NCV-05



A1 ASPHALT PAVING (HEAVY DUTY)
L-701 — 1 1/2" = 1'-0" — P-NCV-08



A3 ASPHALT PAVING (LIGHT DUTY)
L-701 — 1 1/2" = 1'-0" — P-NCV-07

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

Owner
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121 Lamon Street
Fayetteville, NC 28301

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227 Fayetteville Street, Suite 301
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919-821-0805

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1 Glenwood Ave., Suite 600
Raleigh, NC 27603

Water Resources
Tomo Engineering
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Electrical Engineer
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603

KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH — REGISTERED LANDSCAPE ARCHITECT — 2138 — NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	ADDENDUM 02	04/10/26
03	REVISED BID SET	07/24/26

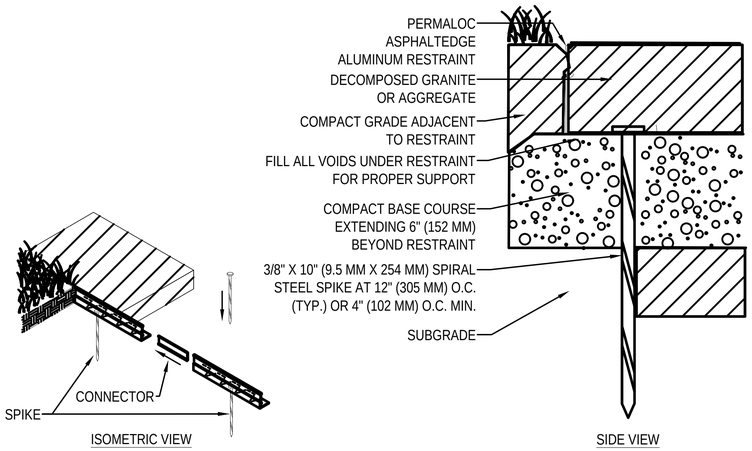
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PROJECT NO. 19097.000

SHEET TITLE
SITE DETAILS

SHEET NUMBER
L-701

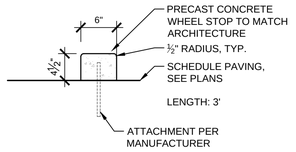


NOTES:

1. INSTALL PER MANUFACTURER'S "INSTALLATION GUIDELINES".
2. 8'-0" (2.44 M) SECTIONS CONNECTED WITH 4" (102 MM) SLIDING CONNECTOR.
3. CORNERS: NOTCH BASE ONLY AND FORM A CONTINUOUS CORNER.
4. PERMALOC ASPHALTEDGE AS MANUFACTURED BY PERMALOC CORPORATION.
5. DO NOT SCALE DRAWING.
6. THIS DRAWING IS INTENDED FOR USE BY ARCHITECTS, ENGINEERS, CONTRACTORS, CONSULTANTS AND DESIGN PROFESSIONALS FOR PLANNING PURPOSES ONLY. THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION.
7. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.
8. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info AND ENTER REFERENCE NUMBER 006-060.

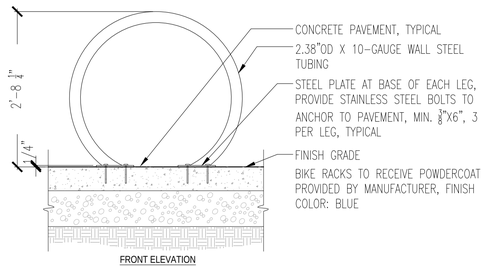
D1 / L-702 **METAL EDGE | STONE FINES**
3/4" = 1'-0"

P-NCV-44



F5 / L-702 **PRECAST WHEEL STOP**
1" = 1'-0"

P-NCV-16

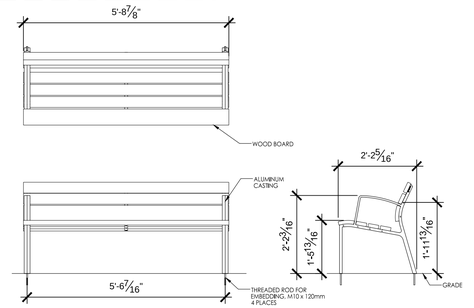


FRONT ELEVATION

D4 / L-702 **BIKE RACK**
1/2" = 1'-0"

P-NCV-17

FOR REFERENCE ONLY, NOT IN CONTRACT

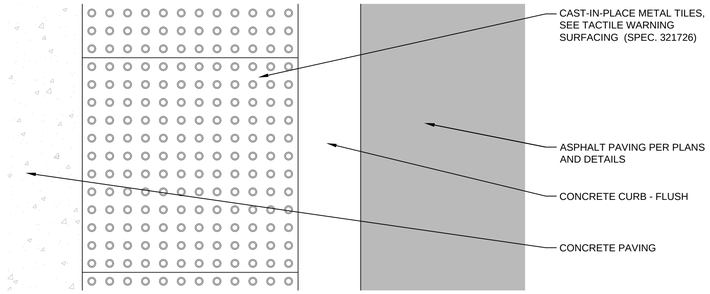


NOTES:

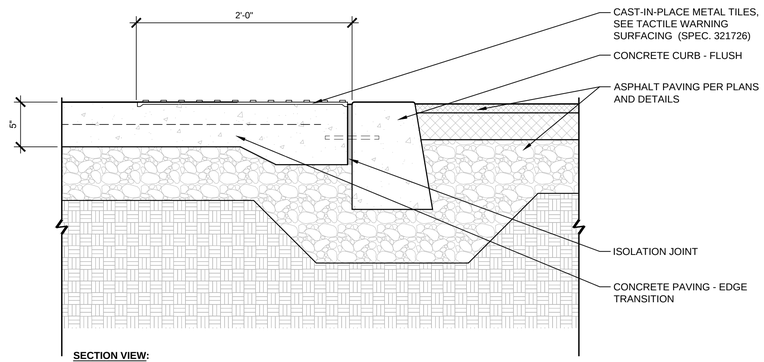
1. MANUFACTURER: LANDSCAPE FORMS.
2. MODEL: NEOLIVIANO,69" BACKED, EMBEDDED, WOOD.
3. FINISH: FRAME- ALUMINUM; WOODGRAIN- EXTERIOR GRADE DOMESTICALLY SOURCED THERMALLY MODIFIED ASH
4. INSTALL SURFACE-MOUNTED IN STRICT ACCORDANCE WITH MANUFACTURER INSTALLATION INSTRUCTIONS, INCLUDING THE USE OF STAINLESS-STEEL HARDWARE.

D6 / L-702 **DETAIL | BACKED BENCH**
1/2" = 1'-0"

P-NCV-19



PLAN VIEW:



SECTION VIEW:

NOTES:

1. SEE DIVISION 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. COMPLY WITH ALL APPLICABLE CODES, LAWS AND REGULATIONS RELATED TO ACCESSIBILITY AND TACTILE WARNING SURFACING.
3. COMPLY WITH CURB RAMP DRAWING INDEX AND GENERAL NOTES.
4. UNIT PAVING SHALL BE INSTALLED AS SHOWN, MINIMIZING CUTS. FOR RADIAL APPLICATIONS, THE REGULAR STACK BOND PATTERN MAY BE BROKEN. REFER TO SITE FEATURES PLANS FOR ADDITIONAL GRAPHIC REPRESENTATIONS.

A5 / L-702 **DETAIL | TACTILE WARNING SURFACING**
1 1/2" = 1'-0"

P-NCV-38

North Carolina Veterans Park Phase II

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Fayetteville, NC
28301

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SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

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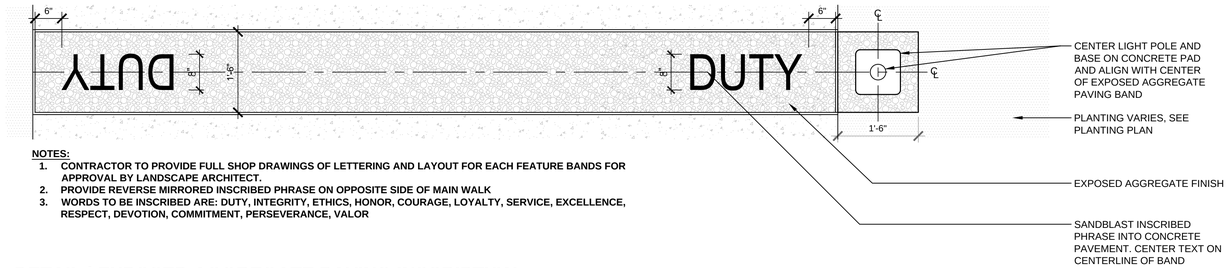
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PROJECT NO. 19097.000

SHEET TITLE
SITE DETAILS

SHEET NUMBER
L-702

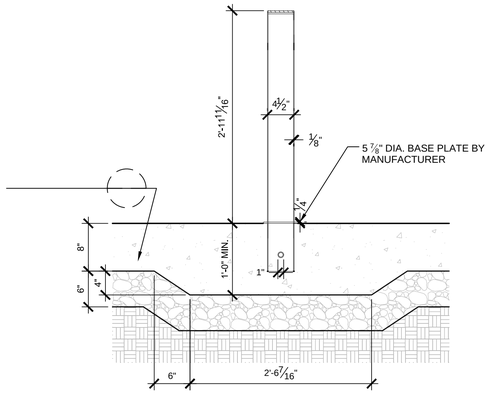


NOTES:

1. **CONTRACTOR TO PROVIDE FULL SHOP DRAWINGS OF LETTERING AND LAYOUT FOR EACH FEATURE BANDS FOR APPROVAL BY LANDSCAPE ARCHITECT.**
2. **PROVIDE REVERSE MIRRORED INSCRIBED PHRASE ON OPPOSITE SIDE OF MAIN WALK**
3. **WORDS TO BE INSCRIBED ARE: DUTY, INTEGRITY, ETHICS, HONOR, COURAGE, LOYALTY, SERVICE, EXCELLENCE, RESPECT, DEVOTION, COMMITMENT, PERSEVERANCE, VALOR**

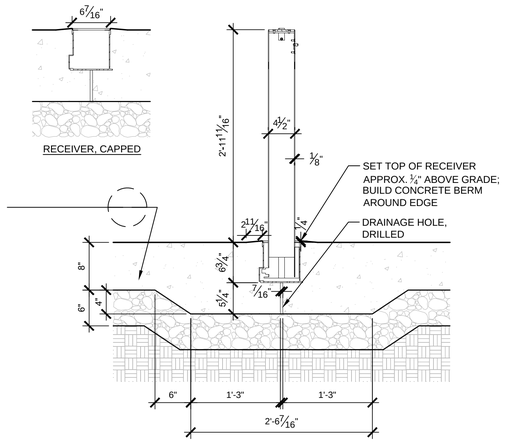
F1 L-703 **DETAIL | EXPOSED AGGREGATE PAVING INSCRIPTION**
3/4" = 1'-0"

P-NCV-51



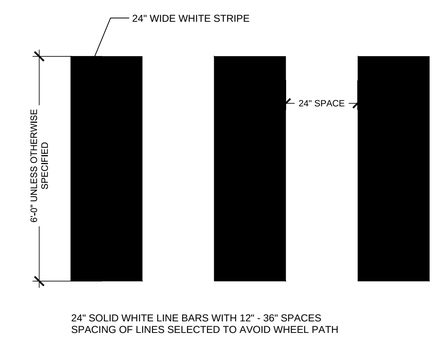
D1 L-703 **SECTION | PERMANENT BOLLARD**
1" = 1'-0"

P-NCV-42



D3 L-703 **SECTION | REMOVABLE BOLLARD**
1" = 1'-0"

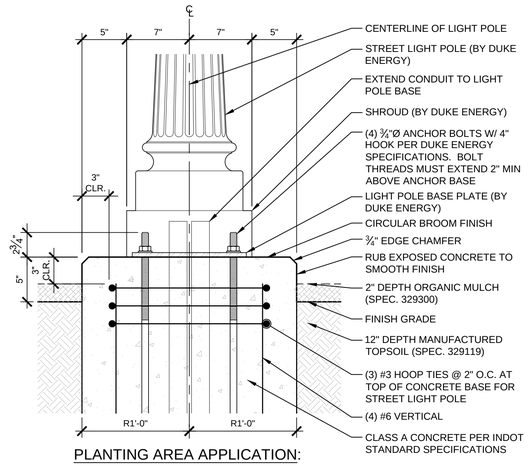
P-NCV-40



24" SOLID WHITE LINE BARS WITH 12" - 36" SPACES
SPACING OF LINES SELECTED TO AVOID WHEEL PATH

D4 L-703 **CROSSWALK STRIPING**
3/8" = 1'-0"

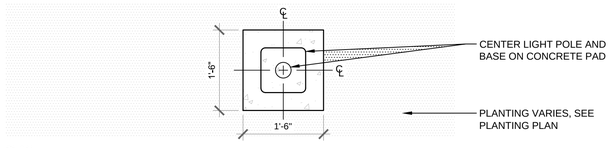
P-NCV-27



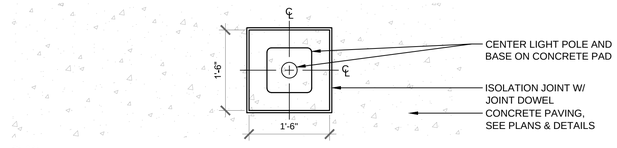
PLANTING AREA APPLICATION:

D6 L-703 **SECTION | STREET LIGHT POLE @ FINISH GRADE**
1 1/2" = 1'-0"

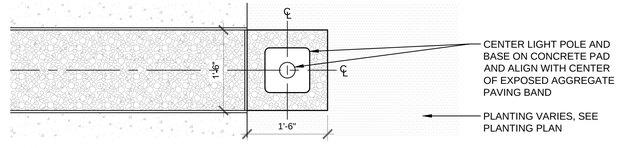
P-NCV-34



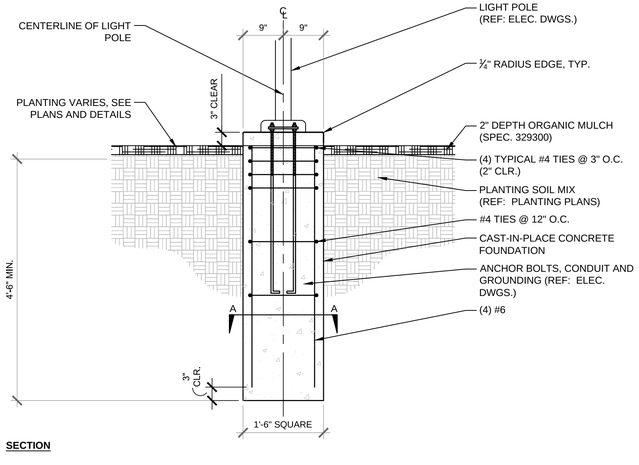
PLAN



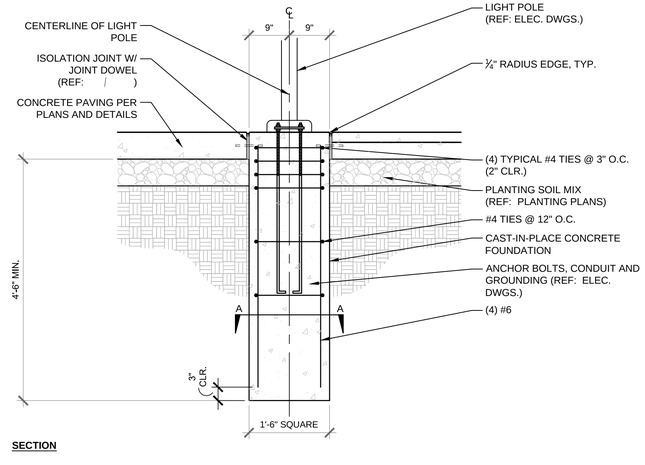
PLAN



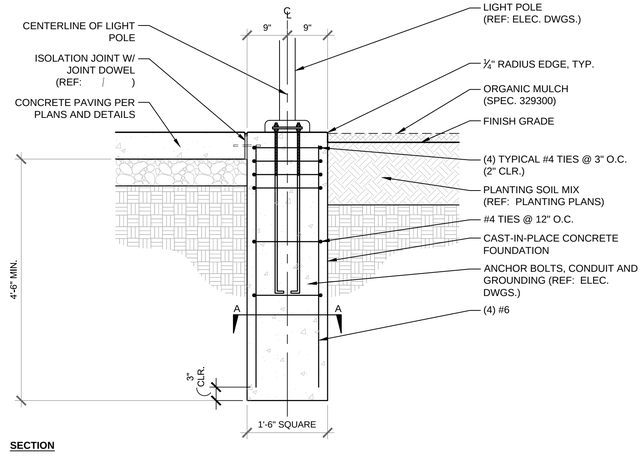
PLAN



SECTION



SECTION



SECTION

A1 L-703 **SECTION | INDEPENDENT PEDESTRIAN POLE BASE**
3/4" = 1'-0"

P-NCV-37

A3 L-703 **SECTION | INDEPENDENT PEDESTRIAN POLE BASE**
3/4" = 1'-0"

P-NCV-36

A6 L-703 **SECTION | INDEPENDENT PEDESTRIAN POLE BASE**
3/4" = 1'-0"

P-NCV-35

North Carolina Veterans Park Phase II

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SEAL | DATE 07/24/26

LISA A. ESTERRICH — REGISTERED LANDSCAPE ARCHITECT — 2138 — NORTH CAROLINA

SHEET ISSUE

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02	REVISED BID SET	07/24/26

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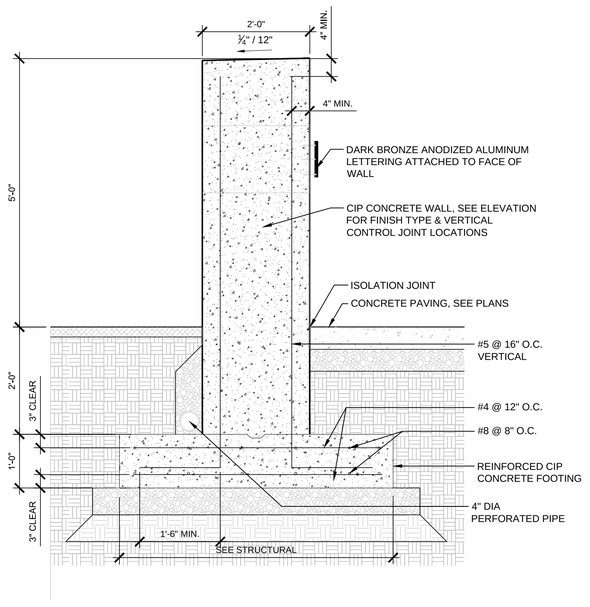
PROJECT NO. 19097.000

SHEET TITLE

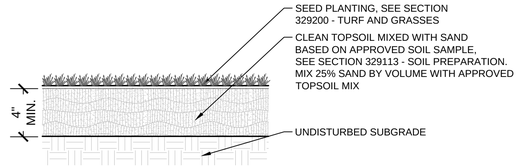
SITE DETAILS

SHEET NUMBER

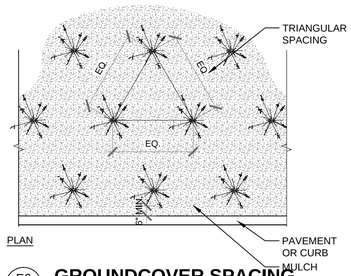
L-703



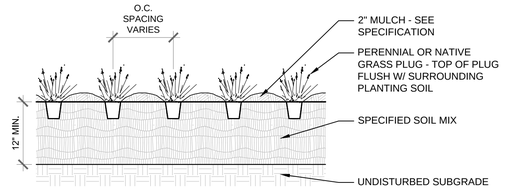
C1 L-704 **SECTION | MONUMENT SIGN**
3/4" = 1'-0" P-NCV-11



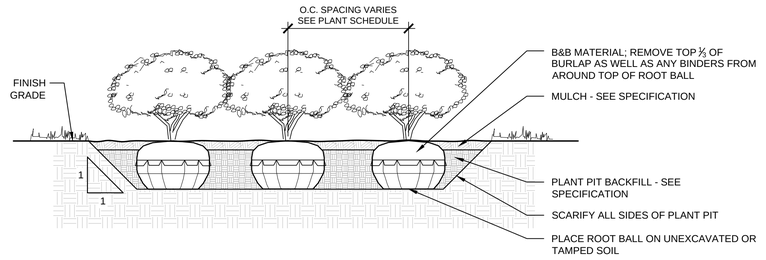
E3 L-704 **TOPSOIL MIX**
1" = 1'-0" P-NCV-53



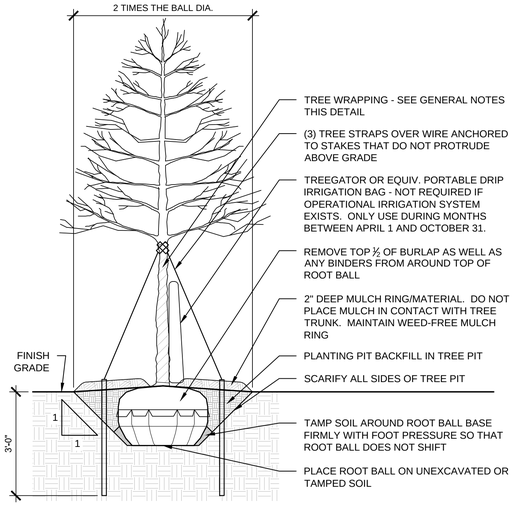
E6 L-704 **GROUNDCOVER SPACING**
3/4" = 1'-0" P-NCV-33



D6 L-704 **DETAIL | PLUG PLANTING**
3/4" = 1'-0" P-NCV-23



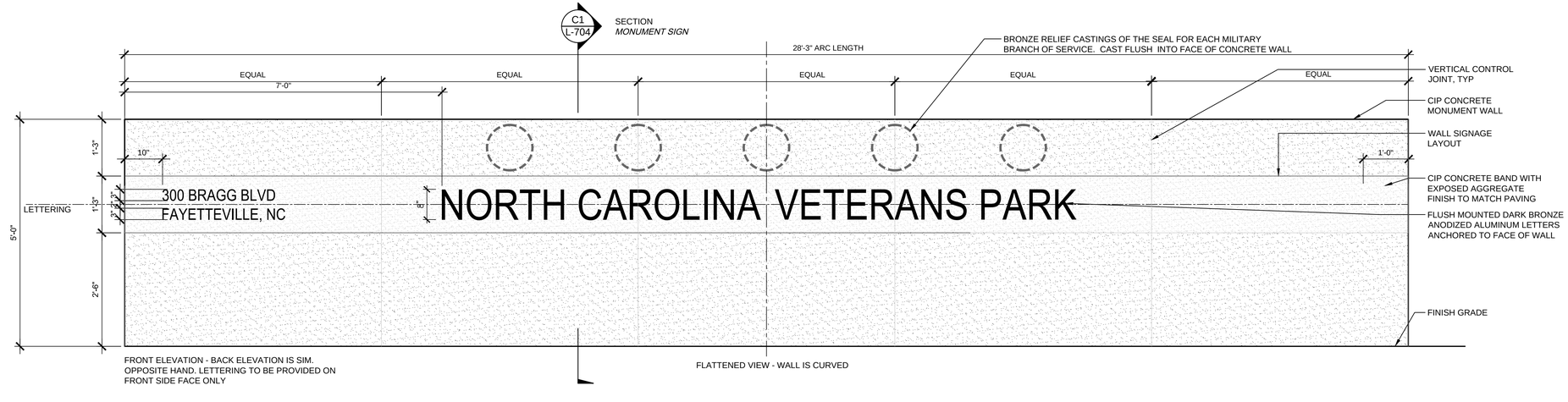
D4 L-704 **DETAIL | SHRUB PLANTING (DECIDUOUS OR EVERGREEN)**
1/2" = 1'-0" P-NCV-22



A6 L-704 **DETAIL | TREE PLANTING (DECID. OR EVRGRN.)**
1/2" = 1'-0" P-NCV-21

GENERAL NOTES:

1. TREE WRAPPING SHALL BE IN PLACE ONLY IN MONTHS BETWEEN OCTOBER 31 AND APRIL 1.
2. TREE WRAPPING TO BE PLACED ONLY ON TREES WITH THIN BARK.
3. DO NOT HEAVILY PRUNE THE TREE AT PLANTING. PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED; HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.
4. EACH TREE MUST BE PLANTED SUCH THAT THE TRUNK FLARE IS VISIBLE AT THE TOP OF THE ROOT BALL. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.



A1 L-704 **FLATTENED ELEVATION | MONUMENT SIGN**
3/4" = 1'-0" P-NCV-10

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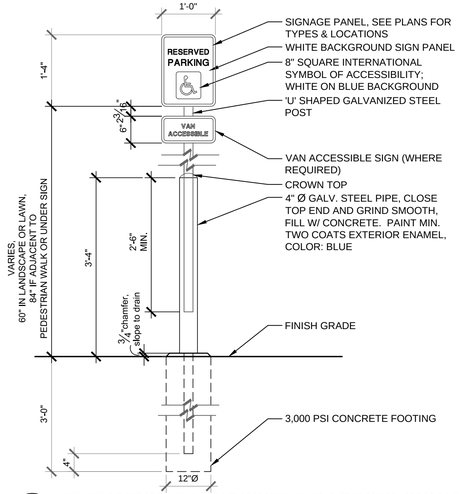
RATIO

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PROJECT NO. 19097.000

SHEET TITLE
SITE DETAILS

SHEET NUMBER
L-704



E6 / L-705

ELEVATION | ACCESSIBLE PARKING SIGNAGE

3/4" = 1'-0"

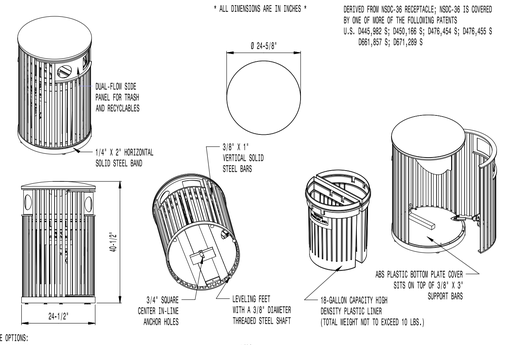
P-NCV-25

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WEB SITE: HTTP://WWW.VICTORSTANLEY.COM

* ALL DIMENSIONS ARE IN INCHES *

DERIVED FROM RSDC-36 RECEPTACLE; RSDC-36 IS COVERED BY ONE OF MORE OF THE FOLLOWING PATENTS
U.S. D445,982 S; D450,166 S; D476,454 S; D476,455 S
D661,857 S; D671,289 S



AVAILABLE OPTIONS:

POWDER COATING
10 STANDARD COLORS, 2 OPTIONAL METALLIC COLORS, CUSTOM COLORS (INCLUDING THE RAL RANGE)

CUSTOM PLAQUES & DECALS
AVAILABLE WITH STEEL PLAQUES IN VARIOUS SIZES AND PRESSURE SENSITIVE VINYL OUTDOOR DECALS

LIDS
AVAILABLE WITH CONVEX LID WITH DIVIDER (AS SHOWN), AND CONVEX LID WITH STAINLESS STEEL ASHTRAY WITH DIVIDER

SECURITY
AVAILABLE WITH STANDARD LOCKABLE LATCH (AS SHOWN), OPTIONAL KEYED LOCK BOX, LID BOLTED IN PLACE, AVAILABLE WITH OPTIONAL MOUNT WITH 3 IN-LINE ANCHOR HOLES AND BOTTOM PLATE COVER (AS SHOWN)

NOTES:
1. DRAWINGS NOT TO SCALE. DO NOT SCALE DRAWINGS.
2. ALL FABRICATED METAL COMPONENTS ARE STEEL SHOTBLASTED, ETCHED, PHOSPHATIZED, PREHEATED, AND ELECTROSTATICALLY POWDER-COATED WITH T.G.I.C. POLYESTER POWDER COATINGS. PRODUCTS ARE FULLY CLEANED AND PRETREATED, PREHEATED AND COATED WHILE HOT TO FILL CREVICES AND BUILD FILM COATING. COATED PARTS ARE THEN FULLY CURED TO COATING MANUFACTURER'S SPECIFICATIONS. THE THICKNESS OF THE RESULTING FINISH AVERAGES 8-10 MILS (200-250 MICRONS).
3. OIL IMPREGNATED BRONZE BUSHINGS AND STAINLESS STEEL PIVOT PINS FOR DOOR MOVEMENT, STANDARD 3/16" SOLID STEEL LATCH ASSEMBLY.
4. THIS VICTOR STANLEY, INC. PRODUCT MUST BE PERMANENTLY AFFIXED TO THE GROUND. CONSULT YOUR LOCAL CODES FOR REGULATIONS.
5. VICTOR STANLEY, INC., PLASTIC INNER LINERS ARE MOLDED ON TOOLING DESIGNED FOR AND OWNED BY VICTOR STANLEY, INC. THEY OFFER MAXIMUM CAPACITY AND STRENGTH WITH LIGHTWEIGHT CONSTRUCTION USING CRITICAL MOLDED RIBS, INTEGRAL HANDHOLDS, AND HIGH-STRENGTH MATERIALS. THIS MINIMIZES HANDLING DIFFICULTY AND FACILITATES EASY EMPTYING AND STORAGE WHILE AFFORDING LONG SERVICE LIFE.
6. ANCHOR BOLT NOT PROVIDED BY VICTOR STANLEY, INC.
7. FOR HIGH SALT ABUSIVE CLIMATES, HOT-DIP GALVANIZING BEFORE POWDER COATING IS AVAILABLE. HOT-DIP GALVANIZING IS PERFORMED FOR VICTOR STANLEY, INC. BY AN EXPERIENCED QUALIFIED FIRM TO WHICH PRODUCTS ARE SHIPPED FOR GALVANIZING. HOT-DIP GALVANIZING INCLUDES AN AGGRESSIVE PRE-TREATMENT AND IMMERSION IN A TANK OF CHARGED LIQUID ZINC AT OR AROUND 860°F (460°C). THE RESULTING SURFACE IS RESISTANT TO RUST BUT HAS SOME UNEVENNESS RESULTING FROM THE BONDING OF THE ZINC TO THE STEEL SURFACE. AS A RESULT, THE POWDER-COATING SURFACE FINISH OVER THAT GALVANIZED SURFACE MAY EXHIBIT BUMPS, UNEVENESS, AND MAY NOT BE AS SMOOTH AS THE STANDARD FINISH; THIS UNEVEN AND INCONSISTENT FINISH IS NORMAL FOR GALVANIZING. CONTACT MANUFACTURER FOR DETAILS.
8. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE. CONTACT MANUFACTURER FOR DETAILS.
9. THIS PRODUCT IS SHIPPED FULLY ASSEMBLED.

RSDC-36
STEELSITES™ SERIES

36-GALLON SIDE-DOOR-OPENING RECYCLING STATION WITH SIDE ACCESS
SHOWN: STANDARD CONVEX LID WITH DIVIDER
STANDARD HALF-MOON LINERS AND ABS BOTTOM PLATE WITH DIVIDER

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REV. 9/21/15 DRAWN L.D.L. 2015-846

A5 / L-705

TRASH RECEPTACLE

1" = 1"

P-NCV-46

North Carolina Veterans Park Phase II

300 Bragg Blvd.
Fayetteville, NC
28301

Owner
City of Fayetteville
121 Lamon Street
Fayetteville, NC 28301

Landscape Architect
RATIO
227 Fayetteville Street, Suite 301
Raleigh, North Carolina 27601
919-821-0805

Civil Engineer / Environmental
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Raleigh, NC 27603

Water Resources
Tomo Engineering
2319 Cardinal Drive
Durham, NC 27707

Electrical Engineer
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603

KEY PLAN

SEAL | DATE 07/24/26

LISA A. ESTERRICH
REGISTERED LANDSCAPE ARCHITECT
2138
NORTH CAROLINA

SHEET ISSUE

01	BID SET	01/26/26
02	REVISED BID SET	07/24/26

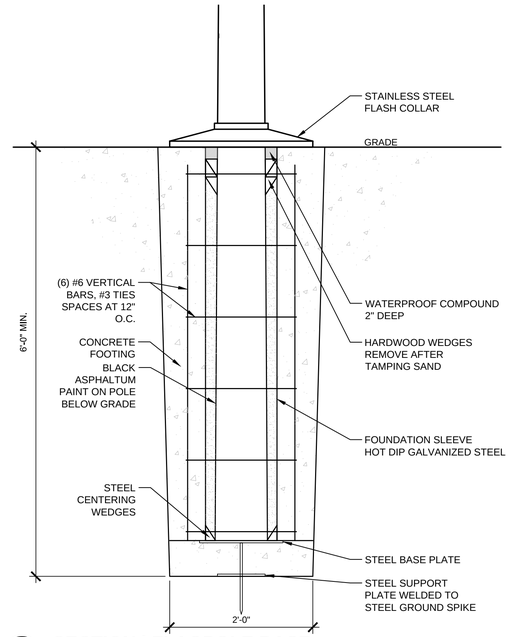
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PROJECT NO. 19097.000

SHEET TITLE
SITE DETAILS

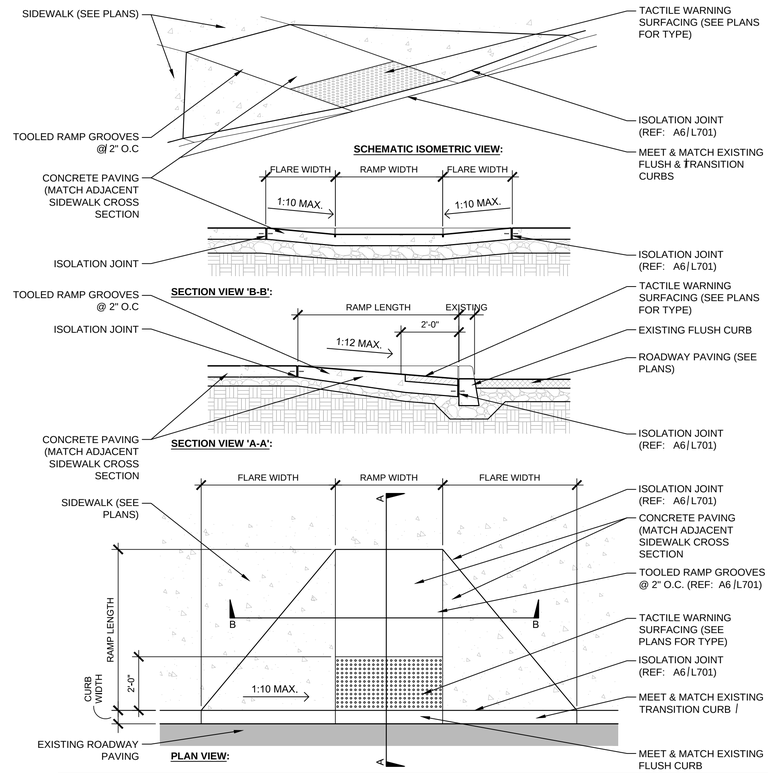
SHEET NUMBER
L-705



C6 / L-706 **SECTION | FLAGPOLE BASE**

1" = 1'-0"

P-NCV-52



NOTES:

1. SEE DIVISION 32 OF THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. **CONCRETE PAVING JOINTS:** SEE A6/L-701 FOR JOINT DETAILS.
3. COMPLY WITH CURB RAMP DRAWING INDEX AND GENERAL NOTES. REFER TO / .
4. THE BOTTOM EDGE OF THE RAMP AND TOP OF CURB SHALL BE FLUSH WITH THE EDGE OF ADJACENT PAVEMENT AND GUTTER LINE.
5. CURB RAMP SURFACE SHALL BE COARSE-BROOMED TRANSVERSE TO THE RUNNING SLOPE.

A5 / L-706 **PERPENDICULAR CURB RAMP W/ADJACENT WALKABLE SURFACE**

3/8" = 1'-0"

P-NCV-15

North Carolina Veterans Park Phase II

300 Bragg Blvd. Fayetteville, NC 28301

Owner
City of Fayetteville
121 Lamon Street
Fayetteville, NC 28301

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SHEET TITLE
SITE DETAILS

SHEET NUMBER
L-706