PROJECT MANUAL
FOR

Village Hall Park

VILLAGE OF MARVIN, NORTH CAROLINA

PRELIMINARY - DO NOT USE FOR CONSTRUCTION

FOR BIDDING ONLY

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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.

J. “Mass Rock”: Any material that cannot be dislodged by a Caterpillar D-8 bulldozer, or equivalent, equipped with a single tooth ripper, without the use of impact hammers, drilling, or blasting. Boulders or masses of rock exceeding ½ cubic yard in volume may also be considered mass rock. These classifications do not include materials such as loose rock, concrete, or other materials that can be removed by means other than impact hammering, but which for any reason, such as economic reasons, the Contractor chooses to remove by impact hammering.

K. “Trench Rock”: Any material that cannot be dislodged by a Caterpillar 325 hydraulic backhoe, or equivalent, without the use of impact hammers or drilling and blasting. Boulders or masses of rock exceeding ½ cubic yard in volume may also be considered trench rock. These classifications do not include materials such as loose rock, concrete, or other materials that can be removed by means other than impact hammering, but which for any reason, such as economic reasons, the Contractor chooses to remove by impact hammering.

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.

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."

INVITATION FOR BIDS

Marvin Village Hall

Date: June 30th, 2025 **BID ID # 1000**

The Village of Marvin will be accepting sealed bids for the construction of the new Village Hall Park that will be located at 10006 Marvin School Road, Marvin NC 28173; all bids are subject to all terms, conditions, and provisions, etc., set forth herein and attached. A single combined bid package encompassing all General contracting services for construction of a new Village Hall Park shall be accepted from June 30th, 2025 until July 31st, 2025 at 2:00 p.m. E.S.T. The extent of the work is shown on the drawings prepared by Dewberry Engineers Inc. titled "Village Hall Park Phase 1" and dated "6/4/2025" & specified in the project manual. A pre bid meeting will be held on July 14th from 11:00AM to 12:00PM at Village Hall. Any questions must be submitted to Tyler Huneycutt (thuneycutt@marvinnc.gov) and Christina Amos (manager@marvinnc.gov) by 5:00 pm on July 16th. All sealed bids shall be submitted to the Village of Marvin either in person or by mail to the attention of the Village Manager, Christina Amos, or Recreation Manager, Tyler Huneycutt by 2:00 p.m. E.S.T. on July 31st, 2025 at 10006 Marvin School Road, Marvin, NC 28173 at which time and location all bids will be opened and announced publicly. Facsimiles or electronic responses are not acceptable. For purposes of exact time determination, the clock in the Village of Marvin Council Room will be used. **LATE BIDS WILL NOT BE ACCEPTED**.

It is the intent of the Village to award a Contract to the lowest responsive, responsible Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. However, the Village reserves the right to reject any and all bids. The Village reserves the sole right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Village's judgment, is in the Village's own best interests. Alternates will be reviewed in consideration of the overall project cost to determine feasibility within the project budget. The Village shall accept or reject any alternates in any order or combination. To determine the lowest bidder, the Village shall calculate the sum of the total base bid and/or the deduction or addition of the alternates, if accepted.

For more project information, call Tyler Huneycutt, Recreation Events Coordinator at 704-843-1680 or Thuneycutt@marvinnc.gov

The Village of Marvin (hereafter, the "Village" or "Owner") will receive sealed bids for the following Project:

PROJECT NAME: **Village Hall Park**

SCOPE OF WORK: Construction of a new park adjacent to the existing Village of Marvin Town Hall shall include a lawn area, a graded pad for future amphitheater, pervious concrete sidewalk, a gravel hiking trail connection, a underground rainwater cistern, an enhanced landscape planting area, storm drainage, and landscaping. For reference the construction documents are attached.

BIDDING SUBSTITUTION/PRIOR APPROVAL REQUESTS: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Bidding and Contracting Documents, shall be submitted prior to receipt of bids. (See Attachments 1, 2 and 3, hereby incorporated by reference.)

CONTRACT DOCUMENTS: The Contract Documents are this Project Manual (which contains the Invitation to Bid, Instructions to Bidders, Bid Documents, Agreement, Forms, Supplementary General Conditions, MBE Guidelines, Dispute Resolution Requirements, and Specifications), the Plans & Drawings, and any addenda. Contractors shall adhere to the specifications in the project plans including but not limited to sheets SP1-SP3.

BID DEADLINE: All sealed bids shall be submitted to the Village of Marvin either in person or by mail to the attention of Village Manager, Christina Amos, or Recreation Activities Coordinator, Tyler Huneycutt by July 31, 2025 at 2:00 p.m. E.S.T. at 10006 Marvin School Road, Marvin, NC 28173 at which time and location all bids will be opened and announced publicly by the Project Architect.

TIMELINE:

Project Advertisement	June 30, 2025
Bid Documents Available	June 30, 2025
On-site Pre-Bid Meeting 11:00AM – 12:00 PM	July 14, 2025
Bids due by 2:00 PM EST	July 31, 2025
Village Council to Award Contract	August 28, 2025
Completion of Project	November 30, 2026

CONTENT OF BID: Each Bid shall contain the following fully-completed forms / documents:

- Instructions to Bidders
- Bid Proposal Form
- Representative Projects Form
- Execution of Bid Form
- Bid Bond
- MBE Forms
- Bidding Substitution Request Form

All Bids shall be placed in a sealed envelope with the following information printed on the outside of the envelope:

BID FOR:	Village Hall Park ***Project Name***	**BID ID # 1000**
BIDDER'S NAME:	_____ ***Contractor's Name***	
DO NOT OPEN UNTIL:	July 31, 2025 2:00 p.m. E.S.T ***Bid Opening Date & Time***	

BID BOND: Each proposal must be accompanied by a Bid Deposit of cash, certified check or a fully executed Bid Bond payable to the Village of Marvin in an amount of five percent (5%) of the gross amount of the base-bid proposal executed in accordance with and conditioned as prescribed by North Carolina General Statute 143-129 as amended.

BIDS ARE FIRM OFFERS: All Bids shall be firm offers to contract for 120 days from the Bid Deadline. Unless forfeited, Bid Bonds shall be returned to Bidders upon the earlier of Contract Award or 180 days from the Bid Deadline.

BID PHASE CONTACT: For questions regarding the Project or Instructions to Bidders, contact: Christina Alphin, Village Administrator. The Village will attempt to answer all questions in writing by addenda. THE VILLAGE WILL NOT MAKE ORAL REPRESENTATIONS AND BIDDERS MAY NOT RELY ON ORAL REPRESENTATIONS.

ADDENDA: Addenda will be filed on Village's website and delivered by email to all persons who have requested Contract Documents. The Bidder shall be responsible for inquiring if Addenda have been issued.

SELECTION CRITERIA: It is the intent of the Village to award a Contract to the lowest responsive, responsible Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. However, the Village reserves the right to reject any and all bids. The Village reserves the sole right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Village's judgment, is in the Village's own best interests. Alternates will be reviewed in consideration of the overall project cost to determine feasibility within the project budget. The Village shall accept or reject any alternates in any order or combination. To determine the lowest bidder, the Village shall calculate the sum of the total base bid and/or the deduction or addition of the alternates, if accepted. Consideration will be given only to Bids from contractors who are properly licensed, bonded, experienced in the class of work proposed and who can refer to projects of similar magnitude and character that have been completed by them.

ONLY 1 BID PER ENTITY: No entity or person may submit or participate in the submission of more than one (1) Bid.

NEGOTIATIONS WITH APPARENT LOW BIDDER: The Village reserves the right to negotiate with the lowest responsive and responsible bidder if the bid exceeds estimated costs or available funds. Negotiations may include reduction in bid price, modification, and/or reduction in scope of the work, substitution of materials, or any other alterations to the work, so that the low bid is reduced to within available funds, including a reasonable fund balance for contingency funds to be available during the course of construction.

CONTRACT AWARD: The Village will inform the Selected Bidder of its selection and request that the Selected Bidder submit the executed Agreement plus insurance certificates and payment and performance bonds. The Selected Bidder shall submit the requested documents so that they are received by Village within 10 calendar days (or such other time as designated by Village) from the date of notice of selection. The Selected Bidder's failure to do so will result in forfeiture of its bid bond. The contract shall not be deemed awarded and this Agreement shall not be binding on the Village unless and until both the Selected Bidder and Village have both executed the Agreement.

MBE Goal: The MBE participation goal for this contract is 10%.

Signed by: _____ Printed: _____
(Contractor's authorized company representative)

Contractor's Name:_____

INSTRUCTIONS TO BIDDERS -- ATTACHMENT 1

BIDDING SUBSITUTIONS:

1 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.

2 BIDDING SUBSTITUTIONS

A. Bidding Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Bidding and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Bidding Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:

1. Extensive revisions to the Contract Documents are not required.
2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
3. The request is fully documented and properly submitted.

3 SUBMITTALS

A. Bidding Substitution Request: Submit to Project Architect. Bidding Substitution Request must be made in writing to the Project Architect in compliance with the following requirements:

1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
2. Submittal Format: Submit single electronic copy of each written Bidding Substitution Request, using form included in the Project Manual.

a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:

1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
2) Copies of current, independent third-party test data of salient product or system characteristics.
3) Samples where applicable or when requested by Architect.

4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. 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.
5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Bidding and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
d. Bidder, in submitting the Bidding Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Bidding Substitution Request.

INSTRUCTIONS TO BIDDERS -- ATTACHMENT 2

BIDDER REQUEST FOR INFORMATION FORM

Use this form to request information required for completing bid when information is not contained in the Bidding Documents. Response to request is a clarification only and does not constitute a change to the requirements of the Bidding Documents unless incorporated in a written Addendum.

Project: **Village Hall Park** Project No.: 1000 UAG#2020-66

To: _____ Specification Section #: _____

Contractor: _____

Attn. _____ Requested by: _____

Phone: _____ Phone:

Email: Email:

Bidder's Inquiry:

Signed:

Owner's Response:

Signed: Date:

INSTRUCTIONS TO BIDDERS – ATTACHMENT 3

BIDDERS SUBSTITUTION/PRIOR APPROVAL REQUEST FORM

Submit this completed form with required attachments to request prior approval of product when specifications list required products by name. Request is not required when specifications list products by name and include the terms "Available Products," "Or equal," or "Or equivalent product; in such circumstances, evaluation will be made at time of Contractor submittal. Refer to Instructions to Bidders.

Project: **Village Hall Park** Project No.: 1000 UAG#2020-66

To: _____ Specification Section #: _____

_____ Contractor: _____

Attn.: _____ Requested by: _____

Phone: _____ Phone: _____

Email: _____ Email: _____

Specified Product/Fabrication Method

(List name/description; model no.; manufacturer): _____

_____

Required Information for **Specified** Product:	Attached:
Point by Point Comparative Product Data	☐
Tests	☐
Reports	☐
Fabrication Drawings	☐
Samples (Where Applicable)	☐

Proposed Product/Fabrication Method

(List trade name/description; model no.; manufacturer) : _____

_____

Required Information for **Proposed** Product:	Attached:
Annotated copy of applicable specification	☐ (Required)
Point by Point Comparative Product Data	☐ (Required)
Tests	☐
Reports	☐
Fabrication Drawings	☐
Samples (Where Applicable)	☐
List of Related Changes/Modifications:	_____

Differences between proposed substitution and specified product: _____

_____

_____

Proposed product/fabrication method affects other parts of the Work ☐ No ☐ Yes: Explain _____

_____

Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product as utilized for this project, except as noted herein.
- Qualifications of manufacturer, installer, and other specified parties meet the specified qualifications.
- Same special warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source for replacement parts, as applicable, is available as that specified.
- Proposed substitution does not affect dimensions and functional clearances, except as noted herein.

For the Bidder (Required): _____

Submitted by: _____

Signed: _____

Firm: _____

Telephone: _____

Fax: _____

Email: _____

For the Manufacturer (Required):

Submitted by: _____

Signed: _____

Firm: _____

Telephone: _____

Fax: _____

Email: _____

BID DOCUMENTS

1. Bid Proposal Form
2. Representative Projects Form
3. Execution of Bid Form
4. Bid Bond
5. MBE Forms
6. Bidding Substitution/Prior Approval Request Form, if applicable

BID PROPOSAL FORM

PROJECT NAME: VILLAGE HALL Park
10006 MARVIN SCHOOL ROAD
MARVIN, NC 28173

NAME OF BIDDER:_____

The undersigned bidder hereby offers, in the lump sum amount stated below, to furnish all labor, materials, tools, equipment, apparatus, facilities, transportation and permits for the construction of the Village of Marvin Village Hall at 10006 Marvin School Road, Marvin, NC, if this offer is accepted by the Village.

TOTAL AMOUNT OF BASE BID $_____LUMP SUM
(use figures only)

The base bid amount is to be stated in figures only and is the total amount bid for the entire contract work including all applicable allowances and taxes. Any alteration, erasure, or change must be clearly indicated and initialed by the bidder. The bidder agrees that if there are any discrepancies or questions in the figures, the Village will use the lower figure despite the bidder's intent.

ALLOWANCES AND UNIT PRICES

Item No.	Description	Unit	Estimated Qty	Bid Unit Price	Bid Price
1.	Unsuitable Soil Replacement	CY	75		
2.	Unsuitable Soil Undercut and Removal	CY	75		
3.	Mass Rock Removal	CY	50		
4.	Trench Rock Removal	CY	50		
Total of All Unit Price Bid Items					$

BID PROPOSAL FORM

ACKNOWLEDGEMENT OF ADDENDA:
The undersigned acknowledges receipt of the following addenda:

No. _____ Dated: _____ No. _____ Dated: _____

No. _____ Dated: _____ No. _____ Dated: _____

No. _____ Dated: _____ No. _____ Dated: _____

SUBMITTED BY:
The undersigned agrees to begin work promptly upon receipt of Notice to Proceed and to pursue the work with an adequate work force to complete the work within **8 months** from the Notice to Proceed. Liquidated Damages of **Five Hundred and 00/100 Dollars ($500.00)** per calendar day are hereby agreed upon as assessment from the Contractor for failure to complete the work within the time period stated herein.

Company Name: _____

Mailing Address: _____

City/State/Zip: _____

Telephone: _____ Email: _____

Printed Name: _____ Title: _____

Signature: _____ NC Gen. Contractor License #: _____

REPRESENTATIVE PROJECTS FORM

1. Project: _____
   Owner: _____
   Contract Price: _____
   Date Completed: _____
   Owner Contact: _____

2. Project: _____
   Owner: _____
   Contract Price: _____
   Date Completed: _____
   Owner Contact: _____

3. Project: _____
   Owner: _____
   Contract Price: _____
   Date Completed: _____
   Owner Contact: _____

Contractor Name:

_____

EXECUTION OF BID FORM

PROJECT NAME: Village Hall Park

The person executing the Bid, on behalf of the Bidder, being first duly sworn, deposes and says that:

(1) It is the intent of the Bidder to enter into this Contract to furnish materials, labor, and equipment required to perform all work specified in accordance with the instructions, terms, conditions, provisions, specifications, plans and all other Contract Documents incorporated into this Invitation to Bid;

(2) He/she is fully informed regarding the preparation and contents of the attached Bid and of all pertinent circumstances regarding such Bid;

(3) Neither he/she, nor any official, agent or employee of the Bidder has entered into any agreement, participated in any collusion, or otherwise taken any action which is a restraint of free competitive bidding in connection with is Bid;

(4) He/she will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, disability, or veteran's status; and

Type of Bidder: ☐ Sole Proprietor ☐Partnership ☐ Limited Liability Company ☐ Corporation ☐ Joint Venture (Check appropriate box)

BIDDER #_____ (# to be filled in by Village)

Name _____

Address _____

_____

Phone _____

Fax _____

Printed Name _____

SIGNATURE _____

Title _____

NC General Contractor's License Number _____

Classification _____

Limits _____

Subscribed and sworn before me
this _____ day of _____, 20___

_____
Signature

My commission expires _____

BID BOND

(Attach Bond to this sheet)

MBE FORMS

(Attach appropriate forms to this sheet)

BIDDING SUBSTITUTION/ PRIOR APPROVAL REQUEST FORM

(Attach to this sheet, if applicable)

AGREEMENT

1. Agreement for Construction attached in appendix
2. Surety Company Contacts
3. Performance Bond
4. Payment Bond
5. Certificate of Insurance

AGREEMENT FOR CONSTRUCTION

Contractor shall adhere to all conditions within the AIA contracts herein attached within the Appendix of this manual.

To be completed by Village of Marvin:

The Agreement/s herein as attached has been pre-audited in the manner required by the "Local Government Budget and Fiscal Control Act."

By: _____
Finance Officer

Date: _____

SURETY COMPANY CONTACTS

PERFORMANCE BOND NO. _____

Surety Name: _____

Address: _____
_____
_____

Phone No.: _____

Contact: _____

PAYMENT BOND NO. _____

Surety Name: _____

Address: _____
_____
_____

Phone No.: _____

Contact: _____

Attach PERFORMANCE BOND to this sheet.

Attach PAYMENT BOND to this sheet.

Attach CERTIFICATE OF INSURANCE to this sheet.

FORMS

1. Contractor's Affidavit Release and Waiver of Claim
2. Contractor's Affidavit of Payment of Debts and Claims
3. State/ County Sales/Use Tax Statement

CONTRACTOR'S AFFIDAVIT RELEASE AND WAIVER OF CLAIM

STATE OF _____ COUNTY OF _____

_____, _____
(Name) (Title)

_____, being first dully sworn, deposes and says that:
(Contractor)

The undersigned is authorized to execute this Affidavit, Release and Waiver of Claim on behalf of the Contractor and that he has personal knowledge of all facts set forth herein;

Project: _____ Project No. _____

All payrolls, material bills, sales tax, social security tax, state and federal unemployment insurance, and all other liabilities and taxes owed by the Contractor and arising in any manner from the above-described project have been paid in full;

No claim or lien exists in favor of any supplier of materials or labor or in favor of any subcontractor furnishing materials or labor on the above-described project;

Notwithstanding the foregoing, if the Village of Marvin, or property of the Village of Marvin, is subject to any claim or lien that arises in any manner from the failure of the Contractor to pay any liability described above, the Contractor will indemnify and hold the Village of Marvin harmless for any amount that the Village of Marvin is required to pay to discharge such lien or settle such claim and, further, will pay the Village of Marvin's expenses, costs, and attorney fees incurred in connection therewith;

All claims, suits, and proceedings of every name, description, or nature arising out of the above project against the Village of Marvin, its officers, employees, and agents have been settled;

The Contractor releases and waives any and all claims of every type and description that the Contractor may have against the Village of Marvin arising in any manner from the construction of the above-described project.

By _____ Date _____

Title _____

Sworn to and subscribed before me this _____ day of_____,20____

_____
(Notary Public)

My commission expires _____

CONTRACTORS' AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

To: (Owner) _____ Contract For:

Project Name and Address: Contract Date:

State of North Carolina County of

The undersigned hereby certifies that, except as listed below, he has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services performed , for all sub-contractors services and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner of his property might in any way be held responsible.

Exceptions:

Contractor:

Address :

By:

Subscribed and sworn to before me this_____day of_____.20

Notary Public:

My Commission Expires:

STATE/COUNTY SALES/USE TAX STATEMENT

Project: _____-

Contractor / Subcontractor _____

Period Covered _____

Invoice No.	Invoice Date	**Vendor's Name**	Amount Before Taxes	**NC Tax**	County Tax	Total Invoice Amount	**County Paid**

I certify that the above-listed vendors were paid sales tax upon purchases of building material during the period covered by the construction estimate, and the property upon which such taxes were paid were, or will be, used in the performance of this Contract. The list above does not include any taxes paid on purchases of tangible personal property that does not annex to, affix to, or in some manner become a part of the project, building, structure or repairs.

Signed _____

Title _____

SUPPLEMENTARY GENERAL CONDITIONS

I. Scope of Work
II. Control of Work
III. Prosecution of Progress
IV. Measurement and Payment
V. Miscellaneous

I. SCOPE OF WORK

1.1 ALTERATION OF WORK AND QUANTITIES – CHANGE ORDERS

The Owner (herein referenced within this document to mean the Village of Marvin) reserves and shall have the right to make such alterations in the Work as may be necessary or desirable to complete the Work in the manner acceptable to Owner. Unless otherwise specified herein, the Owner may make such alterations in the Work as may increase or decrease the originally awarded Contract quantities and otherwise may add to or decrease the scope of Work. The alterations will be memorialized in a written Change Order executed by Owner and Contractor.

Pricing the alterations:

The Owner and the Contractor shall negotiate in good faith an appropriate adjustment and shall conclude these negotiations as expeditiously as possible.

Adjustments to time for alterations: Shall be governed by Section 3.4 of the Supplementary General Conditions.

Interim Directed Changes: Prior to reaching agreement with the Contractor on an adjustment to the Contract Price or Contract Time, if any, the Owner may issue a written Interim Directed Change directing the alteration to proceed pending an agreement.

1.2 MAINTENANCE OF TRAFFIC

When the Contract requires the maintenance of vehicular traffic on an existing road, street, or highway during the Contractor's performance of Work that is otherwise provided for in the Contract Documents, the Contractor shall keep such road, street, or highway open to all traffic and shall provide such maintenance as may be required to accommodate traffic. The Contractor shall furnish, erect, and maintain barricades, warning signs, flagmen, and other traffic control devices in reasonable conformity with the Manual of Uniform Traffic Control Devices for Streets and Highways (published by the United States Government Printing Office), unless otherwise specified herein.

The Contractor shall also construct and maintain in a safe condition any temporary connections necessary for ingress to and egress from abutting property or intersecting roads, streets or highways. Unless otherwise specified herein, the Contractor will not be required to furnish snow removal for such existing road, street, or highway.

1.3 FINAL CLEANING UP

Upon completion of the Work and before acceptance and final payment will be made, the Contractor shall remove from the site all machinery, equipment, surplus and discarded materials, rubbish, temporary structures, and stumps or portions of trees. He shall cut all brush and woods within the limits indicated and shall leave the site in a neat and presentable condition. Material cleared from the site and deposited on adjacent property will not be considered as having been disposed of satisfactorily, unless the Contractor has obtained the written permission of such property owner.

1.4 ACCESS TO THE WORK

The Contractor shall identify access routes with suitable signs, barricades and similar equipment.

The entire access route and construction site shall be kept free and clean of all debris at all times and maintained in good repair by the Contractor. All damage to the access route caused by the actions of the Contractor or his agents shall be immediately repaired to the satisfaction of the Owner.

Contractor' vehicles, equipment, and materials may be stored in the area designated on the Plans, or by the Owner. Upon completion of the work, the storage area shall be cleaned up and returned to its original condition to the satisfaction of the Owner. No special payment will be made for clean up and restoration of the storage area.

1.5 MAINTENANCE DURING CONSTRUCTION

The Contractor shall maintain the Work during construction and until the Work is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and forces so that the Work is maintained in satisfactory condition at all times.

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

All costs of maintenance work during construction and before the project is accepted shall be included in the total cost of the contract, and the Contractor will not be paid an additional amount for such work.

END OF SCOPE OF WORK

II. CONTROL OF WORK

QUALITY REQUIREMENTS

2.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements. The Owner shall hire a testing firm for tests, inspections and approvals. The Contractor shall give the Testing Firm and Consultant timely notice of when and where tests and inspections are to be made so they may be present for such procedures. The Consultant or Owner's Representative shall define the nature of the testing criteria for testing contract purposes.

If such procedures for testing, inspections or approval reveals failure of portions of the Work to comply with requirements established by the Contract Documents, laws, ordinances, rules or regulations – All necessary costs for re-testing, additional Consultant's fee, repair of the Work shall be paid by the Contractor.

The Testing Firm shall distribute the certification of tests, inspections, or approvals to the Owner, Contractor, and Consultant.

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

2.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

2.3 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

2.4 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

2.5 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections.

B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections.

C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

2.6 QUALITY ASSURANCE

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the

system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, 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.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

H. Manufacturer's Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
   d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.

4. Obtain Architect's approval of mockups before starting work, fabrication, or construction. a.

   Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed unless otherwise indicated.

2.7 QUALITY CONTROL

A. Owner/Contractor Responsibilities: Perform quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Engage a qualified testing agency to perform these quality-control services.
2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
3. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

B. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.

C. Retesting/Reinspecting: Provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

2.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

OTHER REQUIREMENTS

2.9 CONFORMITY WITH PLANS AND SPECIFICATIONS

All Work and all materials furnished shall be in within the specified tolerances of the lines, grades, grading sections, cross sections, dimensions, material requirements, and testing requirements that are specified in the contract, plans and specifications.

If the Owner finds the materials furnished, Work performed, or the finished product not within the specified tolerances of the plans and specifications but that the portion of the Work affected will, in its opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, that the affected Work be accepted and remain in place. In this event, the Owner determine an adjustment in the Contract Price for the affected portion of the Work.

If the Owner finds the materials furnished, Work performed, or the finished product are not in within the specified tolerances of the plans and specifications and have resulted in an unacceptable finished product, the affected Work or materials shall be removed and replaced or otherwise corrected by and at the expense of the Contractor in accordance with the Owner's written orders.

For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the Work in accordance with the Contract Documents. The term shall not be construed as waiving the Owner's right to insist on strict compliance with the requirements of the Contract Documents.

2.10 COOPERATION OF CONTRACTOR

The Contractor will be supplied with two copies each of the plans and specifications. He shall have available on the Site at all times one copy each of the plans and specifications. Additional copies of plans and specifications may be obtained by the Contractor for the cost of reproduction.

The Contractor shall give constant attention to the Work to facilitate the progress thereof, and he shall cooperate with the Owner and his/her inspectors, the Engineer and with other contractors in every way possible. The Contractor shall have a competent superintendent on the Work at all times who is fully authorized as his/her agent on the Work. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the Owner or his/her authorized representative.

2.11 COOPERATION BETWEEN CONTRACTORS

The Owner reserves the right to contract for and perform other or additional work on or near the Work covered by this contract.

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

Each contractor involved shall assume all liability, financial or otherwise, in connection with his/her contract and shall protect and save harmless the Owner from any and all damages or claims that may arise because of inconvenience, delays, or loss experienced by him because of the presence and operations of other contractors working within the limits of the same project.

The Contractor shall arrange his/her work and shall place and dispose of the materials being used so as not to interfere with the operations of the other contractors within the limits of the same project. He shall join his/her work with that of the others in an acceptable manner and shall perform it in proper sequence to that of the others.

2.12 AUTHORITY AND DUTIES OF INSPECTORS

Inspectors employed by the Owner shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the Work and to the preparation, fabrication, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

2.13 INSPECTION OF THE WORK

All materials and each part or detail of the Work shall be subject to inspection by the Owner or Owner's inspectors. The Owner and Owner's inspectors shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.
If the Owner or Owner's inspector requests it, the Contractor, at any time before acceptance of the Work, shall remove or uncover such portions of the finished Work as may be directed. After examination, the Contractor shall restore said portions of the Work to the standard required by the specifications. Should the Work thus exposed or examined prove acceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be paid for as Extra Work; but should the Work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

Any Work done or materials used without supervision or inspection by the Owner may be ordered removed and replaced at the Contractor's expense unless the Owner failed to inspect after having been given reasonable notice in writing that the Work was to be performed.

2.14 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

All Work which does not conform to the requirements of the Contract Documents will be considered unacceptable, unless otherwise determined acceptable as provided in the subsection titled CONFORMITY WITH PLANS AND SPECIFICATIONS.

Unacceptable Work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause found to exist prior to the final acceptance of the Work, shall be removed immediately and replaced in an acceptable manner at the Contractor's expense.

Upon failure on the part of the Contractor to comply forthwith with any order of the Owner made under the provisions of this subsection, the Owner will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs (incurred by the Owner) from any monies due or to become due the Contractor.

2.15 LOAD RESTRICTIONS

The Contractor shall comply with all legal load restrictions in the hauling of materials on public roads beyond the limits of the Work. A special permit will not relieve the Contractor of liability for damage which may result from the moving of material or equipment.

The operation of equipment of such weight or so loaded as to cause damage to structures or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damage done by his/her hauling equipment and shall correct such damage at its own expense.

2.16 RETEST OF WORK

When as provided for in the Contract Documents, the Owner performs sampling and tests of the Work and if the tests show a failure to meet the requirements of the Contract Documents, the expense of retesting, after reworking or substitution by the Contractor will be at the expense of the Contractor and such costs will be deducted from the payments otherwise due to the Contractor.

2.17 CHARACTER OF WORKERS, METHODS AND EQUIPMENT

The Contractor shall, at all times, employ sufficient labor and equipment for prosecuting the Work to full completion in the manner and time required by the contract, plans, and specifications.

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

All equipment which is proposed to be used on the Work shall be of sufficient size and in such mechanical condition as to meet requirements of the Work and to produce a satisfactory quality of work. Equipment used on any portion of the Work shall be such that no injury to previously completed work, adjacent property, or existing airport facilities will result from its use.

When the methods and equipment to be used by the Contractor in accomplishing the Work are not prescribed in the contract, the Contractor is free to use any methods or equipment that will accomplish the Work in conformity with the requirements of the contract, plans, and specifications.

Any person employed by the Contractor or by a subcontractor who, in the opinion of the Owner does not perform its work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Owner, be removed forthwith by the Contractor or subcontractor employing such person, and shall not be employed again in any portion of the Work without the approval of the Engineer.

Should the Contractor fail to remove such person or persons or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Owner may suspend the Work by written notice until compliance with such orders.

The failure to provide adequate labor and equipment may be considered cause for terminating the Contract.

2.18 FIRE PREVENTION

A. Contractor shall conform to all Federal, State, and local laws and regulations pertaining to burning, fire prevention and control within or adjacent to the project. Necessary precautions to avoid and eliminate fire hazards shall be the responsibility of the Contractor. This includes keeping the Contract Work area clear of all trash at all times.

B. All tarpaulins used for any purpose during construction of any work shall be made of material resistant to fire, water and weather and shall bear UL labels. Lighting of any fires on premises is strictly forbidden.

C. Contractor shall provide portable fire extinguishers compatible with the hazard of each work area and shall instruct its personnel in their location and use. Wherever welding and burning are conducted, no inflammable materials shall be allowed, and welding

activities shall be shielded. The Contractor shall post a Hot Work Permit whenever an open flame shall be utilized for work.

2.19 PUMPING AND DRAINAGE

Surface or sub-surface water or other fluid shall not be permitted to accumulate in excavations or under any structure. Should such conditions develop or be encountered, the water or other fluid shall be controlled and suitably disposed of by means of temporary pumps, piping, drainage lines and ditches, dams or other methods approved by the Owner and other public agencies having jurisdiction.

2.20 DUST CONTROL

The Contractor, for the duration of the Contract, shall maintain all excavations, embankments, haul roads, access roads, plant sites, waste disposal areas, borrow areas, and all other work areas free from dust. Industry-accepted methods of dust control suitable for the area involved and approved by Owner will be permitted.

2.21 WATER POLLUTION

Contractor shall, at its expense, provide suitable facilities to prevent the introduction of any substances or materials into any stream, river, lake or other body of water, which may pollute the water or constitute substances or materials deleterious to fish and wild life.

2.22 ILLUMINATION

When any work is performed at night or where daylight is shut off or obscured, Contractor shall, at its expense, provide artificial light sufficient to permit work to be carried on efficiently, satisfactorily and safely, and to permit thorough inspection. During such time periods the access to the place of work shall also be clearly illuminated. All wiring for electric light and power shall be installed and maintained in compliance with local code, securely fastened in place at all points, and shall be kept as far as possible from telephone wires, signal wires, and wires used for firing blasts.

2.23 HAZARDOUS MATERIAL

A. The Contractor shall immediately notify Owner of any hazardous materials subsequently found on the site and shall not remove same without the permission of Owner.

B. If the contractor caused the hazardous material and subsequent contamination, Contractor shall remove said hazardous material and contaminated soils or materials from the site and shall dispose of same in accordance with all Federal, State or Local laws or regulations. Removal of such materials and contamination shall be monitored by a licensed hazardous materials laboratory, and said laboratory shall prepare a written report attesting to the complete removal of the contaminating material and resulting contamination, all to the satisfaction of, and at no cost to, the Owner.

2.24 REMOVAL AND DISPOSAL OF OTHER MATERIALS

Contractor shall remove and dispose of all construction debris, cleared vegetation, garbage and refuse in accordance with all Federal, State or Local laws or regulations. “Construction debris” means those materials resulting from the alteration, construction, destruction, rehabilitation, or repair of any manmade physical structure including houses, buildings, industrial or commercial facilities, and roadways.

2.25 EROSION CONTROL

Contractor shall conform to all Federal, State, and local laws and regulations pertaining to erosion control within or adjacent to the project. Contractor shall maintain and include in their bid maintenance of erosion control measures on the plan throughout the life of the project.

Contractor shall limit site disturbance to less than 1-acre at all times during construction.

2.26 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

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.

SUBSTITUTION PROCEDURES

2.27 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

2.28 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

2.29 SUBMITTALS

A. Substitution Requests: Submit three copies of 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: Attachment 3: BIDDERS SUBSTITUTION/PRIOR APPROVAL REQUEST FORM.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution 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 and 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. Certification indicating compliance with HUD material requirements, where applicable.
    k. Detailed comparison of Contractor's construction schedule using proposed substitution 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.
    l. Cost information, including a proposal of change, if any, in the Contract Sum.
    m. 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.
    n. 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.

2.30 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

2.31 SUBSTITUTIONS

A. Substitutions: Submit requests for substitution immediately upon 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:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Requested substitution will not adversely affect Contractor's construction schedule. c. Requested substitution has received necessary approvals of authorities having jurisdiction.
      d. Requested substitution is compatible with other portions of the Work.
      e. Requested substitution has been coordinated with other portions of the Work. f. Requested substitution provides specified warranty.
      g. 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.

END OF CONTROL OF WORK

III. PROSECUTION AND PROGRESS

3.1 NOTICE TO PROCEED

The Owner shall deliver to Contractor a written Notice to Proceed stating the date on which it is expected the Contractor will begin the Work and from which date Contract Time will be charged. The Contractor shall begin the Work to be performed under the contract within ten (10) calendar days of the date set in the Notice to Proceed, but in any event, the Contractor shall notify the Owner in writing at least 24 hours in advance of the time actual construction operations will begin.

3.2 PROSECUTION AND PROGRESS

Unless otherwise specified, the Contractor shall submit his/her progress schedule for the Owner's approval within fourteen (14) work days after execution of this Agreement. The Contractor's progress schedule, when approved by the Owner, may be used to establish major construction operations and to check on the progress of the Work.

If the Contractor falls significantly behind the submitted schedule, the Contractor shall, upon the Owner's request, submit a revised schedule for completion of the Work within the Contract Time and modify his/her operations to provide such additional materials, equipment, and labor necessary to meet the revised schedule. Should the prosecution of the Work be discontinued for any reason, the Contractor shall notify the Owner in writing at least 24 hours in advance of resuming operations.

The Contractor shall not commence any actual construction prior to the date set forth in the Notice to Proceed.

3.3 TEMPORARY SUSPENSION OF THE WORK

The Owner shall have the authority by written notice to the Contractor, to suspend the Work wholly, or in part, for such period or periods as the Owner may deem necessary, or for such time as is necessary due to the failure on the part of the Contractor to carry out orders given or to perform any or all of the Contractor's other duties under this Contract.

A. If the Contractor is ordered by the Owner to suspend the Work under this Section due to an unforeseen cause not otherwise provided for in the other provisions of this Contract and over which the Contractor has no control, the Contractor may be reimbursed for actual money expended on the Work during the period of shutdown. No allowance will be made for anticipated profits. The period of shutdown shall be computed from the effective date of the Owner's order to suspend the Work to the effective date of the Owner's order to resume the Work. Claims for such compensation shall be filed with the Owner within the time period stated in the Owner's order to resume work. The Contractor shall submit with its claim information substantiating the amount shown on the claim.

B. If the Work is suspended under this Section for an indefinite period, the Contractor shall perform the following duties:

    1. Suitably store all materials.

2. Implement measures to protect existing work from damage or deterioration.

3. Erect such temporary structures and barricades as necessary to provide for traffic on, to or from the Project.

4. Periodically inspect and maintain the Work and temporary measures during the suspension period, and repair any damage to the Work during the suspension period.

5. Maintain all insurance and bond coverage.

6. Perform such other work as required by the Contract Documents with respect to the Project.

7. Remobilize when ordered to resume the Work by the Engineer.

The Contractor shall notify the Owner in writing fourteen (14) calendar days prior to demobilizing. At the time that the written notice is given to the Owner, the Contractor shall submit a written estimate of any costs of remobilization except in those cases in which the Contractor will bear the costs of remobilization under Paragraph C hereof. Compliance by the Contractor with such notice requirement, and with the requirement for submitting such written estimate, shall be a prerequisite to the Contractor's right to recover any costs incurred by the Contractor to comply with this Paragraph B, to the extent the Contractor would otherwise have a claim for such costs hereunder.

C. If the Contractor requests a suspension of the Work in whole or in part, or if the Contractor is ordered by the Owner to suspend the Work under this Section due to inclement weather, due to the Contractor's failure to carry out orders given or due to the Contractor's failure to perform any of the Contractor's other duties under this Contract, then:

1. The Contractor shall not be entitled to any additional compensation for fulfilling the duties that the Contractor is required to perform by reason of such suspension, regardless of whether any additional compensation would otherwise be allowed hereunder, including, without limitation, any additional compensation for fulfilling any of the duties that are imposed upon the Contractor under Paragraph B hereof or for fulfilling the Contractor's duty to remobilize at the end of such suspension; and

2. The Contractor shall pay the Owner all of the costs that are incurred by the Owner by reason of such suspension, including, but not limited to, the Engineer's fees and the costs of any necessary inspections or testing during the period of such suspension.

3.4 ADJUSTMENT OF CONTRACT TIME

The Contract Time may be adjusted only by change order, when requested by the Contractor in writing and approved by the Owner, for reasons outside of the Contractor's control, as follows:

A. Natural disasters affecting the site; or

B. Excessive rainfall during the entire calendar month, defined as total monthly rainfall in excess of the normal rainfall for that calendar month and total number of days with more than 0.10 inches of rainfall in excess of the normal number of such days for that calendar month. Normal values shall be taken as published in "Climatography of the United States No. 20 for North Carolina"; or

C. Suspension of the Work as order by the Owner; or

D. Delays in critical work by others that is not part of this Contract; or

E. Significant additions to the scope of the Work.

The Contractor shall bear the burden of proof that a delay has been caused by factors outside his control, shall clearly demonstrate how the delay impacts the critical path of the Work as shown on his work schedule as last revised, and shall demonstrate that he has made reasonable and prudent efforts to overcome the impact of the delay on the critical path. With respect to item (b) above, a condition precedent to meeting its burden of proof will be the monthly submission to the owner of a statement of the number of days, if any, the Contractor was prevented from prosecuting the Work during the immediately preceding month due to excessive rainfall.

3.5 FAILURE TO COMPLETE PUNCH LIST ON TIME

The Contractor shall complete all punch list items determined by the Owner within thirty (30) calendar days. Should the Contractor fail or refuse to complete all punch list items to the satisfaction of the Owner within the said 30-day period, the Owner shall have the right to complete all said punch list items. In such event, Owner shall be entitled to recover from Contractor the Owner's actual costs incurred in completing such punch list items, plus any and all consequential damages and costs incurred by Owner as a result of Contractor's failure to complete such punch list items. Failure to complete all punch list items within sixty (60) calendar days, shall be considered Default of Contract and shall result in loss of any remaining retainage otherwise due to the Contractor.

3.6 DEFAULT AND TERMINATION OF CONTRACT

The Contractor shall be considered in default and such default will be considered as cause for the Owner to terminate the Contract for any of the following reasons if the Contractor:

A. Fails to begin the Work under the Contract within ten (10) calendar days of the date of commencement specified in the "Notice to Proceed"; or

B. Fails to perform the Work or fails to provide sufficient workers, equipment or materials to assure completion of the Work in accordance with the terms of the Contract; or

C. Performs the Work unsuitably or neglects or refuses to remove materials or to perform anew such Work as may be rejected as unacceptable and unsuitable; or

D. Discontinues the prosecution of the Work; or

E. Fails to resume Work which has been suspended within a reasonable time after notice to do so; or

F. Becomes insolvent or is declared bankrupt, or commits any act of bankruptcy or insolvency; or

G. Allows any final judgment related to the Project to stand against him unsatisfied for a period of 10 days; or

H. Makes an assignment for the benefit of creditors; or

I. Fails to perform any covenant of this Contract, or

J. For any other cause whatsoever, fails to carry on the Work in an acceptable manner.

Should the Owner consider the Contractor in default of the Contract for any reason hereinbefore, the Owner shall immediately give written notice to the Contractor and the Contractor's surety as to the reasons for considering the Contractor in default and the Owner's intentions to terminate the contract.

If Contractor or Surety shall fail to cure such default within 10 calendar days after such written notice from the Owner of the existence of such default or, if such default cannot with reasonable diligence be cured within a period of 10 calendar days, then upon the failure of the Contractor to commence to cure such default within said 10-day period and to proceed with due diligence to complete the remedying of said default; then the Owner will, have full power and authority, without violating the Contract, to terminate the Contract and/or to take control of the Work.

All costs and charges incurred by the Owner, together with the cost of completing the Work, will be deducted from any monies due or which may become due the Contractor. If such expense exceeds the sum which would have been payable under the contract, then the Contractor and the surety shall be liable and shall pay to the Owner the amount of such excess.

3.7 TERMINATION FOR CONVENIENCE

At any time after the acceptance of this Contract, the Owner shall have the absolute right to terminate the entire Contract or any part thereof for any reason whatsoever.

3.8 ACTIONS UPON TERMINATION FOR OR CONVENIENCE

Upon receipt of such notice of termination, the Contractor shall:

A. Stop the performance of the Work.

B. Take any other action toward termination of the Work which the Owner directs, including but not limited to:

1. Stabilization of the unfinished site to meet the conditions of the erosion and sediment control permit and at the direction of the Department of Environment and Natural Resources.

2. Maintain the necessary traffic control devices until all potential hazards due to unfinished construction activities have been removed and/or to the satisfaction of the Owner. Traffic control devices that are determined by the Owner to remain shall become the property of the Owner.

3. Complete any pay item as directed by the Owner that if left uncompleted may result in a safety hazard.

4. Deliver all paid stored materials stored off site and material stored on site to a location directed by the Owner.

5. Remove all temporary facilities.

6. Provide any necessary items of Work to secure the Site from public access as directed by the Engineer.

3.9 PAYMENT UPON TERMINATION

When the Contract, or any portion thereof, is terminated before completion of all pay items, payment will be made for the actual number of units or items of Work completed at the Contract price or as mutually agreed for items of Work partially completed.

Reimbursement for organization of the Work, and other overhead expenses, (when not otherwise included in the contract) and moving equipment and materials to and from the job will be considered, the intent being that an equitable settlement will be made with the Contractor.

Acceptable materials, obtained or ordered by the Contractor for the Work and that are not incorporated in the Work shall, at the option of the Owner, be purchased from the Contractor at actual cost as shown by receipted bills and actual cost records at such points of delivery as may be designated by the Owner.

If the sum of all previous payment and credits made by the Owner exceeds the sum payable due to the Contractor, such excess shall be refunded by the Contractor to the Owner immediately upon the determination of such excess by the owner.

If the Contract is terminated for convenience, the Contractor shall be paid a sum as profit determined taking the amount of profit the Contractor would have received upon completing this Contract, multiplied by a fraction, the numerator of which is the value of the Work completed as of the date of receipt of the notice of termination and the denominator of which is the Contract Price.

Termination of the Contract or a portion thereof shall neither relieve the Contractor of his/her responsibilities for the completed Work nor shall it relieve his/her surety of its obligation for and concerning any just claim arising out of the Work performed.

The Owner shall be given full access to all books, cost records, correspondence and papers of the Contractor relating to the Contract in order to determine amounts to be paid the Contractor due to any termination of the Contract

3.10 PARTIAL ACCEPTANCE

If at any time during the prosecution of the Work the Contractor substantially completes a usable unit or portion of the Work, the occupancy of which will benefit the Owner, he may request the Owner to make final inspection of that unit. If the Owner finds upon inspection that the unit has been satisfactorily completed in compliance with the Contract, he may accept it as being completed, and the Contractor may be relieved of further responsibility for that unit. Such partial acceptance and beneficial occupancy by the Owner shall not void or alter any provision of the Contract.

3.11 FINAL ACCEPTANCE

Upon due notice from the Contractor of presumptive completion of the entire Work, the Owner will make an inspection. If all construction provided for and contemplated by the Contract is found to be completed in accordance with the Contract Documents, such inspection shall constitute the final inspection. The Owner shall notify the Contractor in writing of final acceptance as of the date of the final inspection.

If, however, the inspection discloses any Work, in whole or in part, as being unsatisfactory, the Owner will give the Contractor the necessary instructions for correction of same and the Contractor shall immediately comply with and execute such instructions. Upon correction of the Work, another inspection will be made which shall constitute the final inspection, provided the Work has been satisfactorily completed. In such event, the Owner will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

END OF PROSECUTION AND PROGRESS

IV. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT OF QUANTITIES

All Work completed under the Contract will be measured by the Owner, or his/her authorized representatives, using United States Customary Units of Measurement.

The method of measurement and computations to be used in determination of quantities of material furnished and of Work performed under the Contract will be those methods generally recognized as conforming to good engineering practice.

Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures (or leave-outs) having an area of 9 square feet or less. Unless otherwise specified, transverse measurements for area computations will be the neat dimensions shown on the plans or ordered in writing by the Engineer.

Structures will be measured according to neat lines shown on the plans or as altered to fit field conditions.

Unless otherwise specified, all pay items which are measured by the linear foot such as electrical ducts, conduits, pipe culverts, underdrains, and similar items shall be measured parallel to the base or foundation upon which such items are placed.

In computing volumes of excavation the average end area method or other acceptable methods will be used.

The thickness of plates and galvanized sheet used in the manufacture of corrugated metal pipe, metal plate pipe culverts and arches, and metal cribbing will be specified and measured in decimal fraction of inches.

The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois. All materials which are measured or proportioned by weights shall be weighed on accurate, approved scales by competent, qualified personnel at locations designated by the Engineer. If material is shipped by rail, the car weight may be accepted provided that only the actual weight of material be paid for. However, car weights will not be acceptable for material to be passed through mixing plants. Trucks used to haul material being paid for by weight shall be weighed empty daily at such times as the Engineer directs, and each truck shall bear a plainly legible identification mark.

Materials to be measured by volume in the hauling vehicle shall be hauled in approved vehicles and measured therein at the point of delivery. Vehicles for this purpose may be of any size or type acceptable to the Engineer, provided that the body is of such shape that the actual contents may be readily and accurately determined. All vehicles shall be loaded to at least their water level capacity, and all loads shall be leveled when the vehicles arrive at the point of delivery.

When requested by the Contractor and approved by the Engineer in writing, material specified to be measured by the cubic yard may be weighed, and such weights will be converted to cubic yards for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities is used.

Bituminous materials will be measured by the gallon or ton. When measured by volume, such volumes will be measured at 60°F or will be corrected to the volume at 60°F using ASTM D 4311 for asphalts or ASTM D 633 for tars.

Net certified scale weights or weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the work.

When bituminous materials are shipped by truck or transport, net certified weights by volume, subject to correction for loss or foaming, may be used for computing quantities.

Cement will be measured by the ton or hundredweight.

Timber will be measured by the thousand feet board measure (M.F.B.M.) actually incorporated in the structure. Measurement will be based on nominal widths and thicknesses and the extreme length of each piece.

The term "lump sum" when used as an item of payment will mean complete payment for the Work described in the contract.

When a complete structure or structural unit (in effect, “lump sum” work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories.

Rental of equipment will be measured by time in hours of actual working time and necessary traveling time of the equipment within the limits of the work. Special equipment ordered by the Engineer in connection with force account work will be measured as agreed in the change order or supplemental agreement authorizing such force account Work as provided in the subsection titled PAYMENT FOR EXTRA AND FORCE ACCOUNT WORK of this section.

When standard manufactured items are specified such as fence, wire, plates, rolled shapes, pipe conduit, etc., and these items are identified by gage, unit weight, section dimensions, etc., such identification will be considered to be nominal weights or dimensions. Unless more stringently controlled by tolerances in cited specifications, manufacturing tolerances established by the industries involved will be accepted.

Scales for weighing materials which are required to be proportioned or measured and paid for by weight shall be furnished, erected, and maintained by the Contractor, or be certified permanently installed commercial scales.

Scales shall be accurate within one-half percent of the correct weight throughout the range of use. The Contractor shall have the scales checked under the observation of the inspector before beginning work and at such other times as requested. The intervals shall be uniform in spacing throughout the graduated or marked length of the beam or dial and shall not exceed one-tenth of 1 percent of the nominal rated capacity of the scale, but not less than 1 pound. The use of spring balances will not be permitted.

Beams, dials, platforms, and other scale equipment shall be so arranged that the operator and the inspector can safely and conveniently view them.

Scale installations shall have available ten standard 50-pound weights for testing the weighing equipment or suitable weights and devices for other approved equipment.

Scales must be tested for accuracy and serviced before use at a new site. Platform scales shall be installed and maintained with the platform level and rigid bulkheads at each end.

Scales "over weighing" (indicating more than correct weight) will not be permitted to operate, and all materials received subsequent to the last previous correct weighing-accuracy test will be reduced by the percentage of error in excess of one-half of 1 percent.

In the event inspection reveals the scales have been "under weighing" (indicating less than correct weight), they shall be adjusted, and no additional payment to the Contractor will be allowed for materials previously weighed and recorded.

All costs in connection with furnishing, installing, certifying, testing, and maintaining scales; for furnishing check weights and scale house; and for all other items specified in this subsection, for the weighing of materials for proportioning or payment, shall be included in the unit Contract prices for the various items of the project.

When the estimated quantities for a specific portion of the Work are designated as the pay quantities in the contract, they shall be the final quantities for which payment for such specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the plans are revised by the Engineer. If revised dimensions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the authorized changes in the dimensions.

The following allowances and unit costs shall be included in the Contractor's Bid.

UNIT PRICE #1 – UNSUITABLE SOIL REPLACEMENT
Description: Unsuitable soil replacement shall be paid for as noted and as specified in the Contract Documents to include, but not limited to, all fees and costs to provide all equipment and materials, and manpower to dispose of unsuitable soil legally, backfill with acceptable material within the limits of excavation, compact, and test the soil in the project limits.
Unit of Measurement: Cubic Yard

UNIT PRICE #2 UNSUITABLE SOIL UNDERCUT AND REMOVAL
Description: Unsuitable soil undercut and removal shall be paid for as noted and as specified in the Contract Documents to include, but not limited to, all fees and costs to provide all equipment and materials, and manpower to excavate, dispose of legally, backfill with acceptable material below the limits of excavation, compact, and test the soil in the project limits.
Unit of Measurement: Cubic Yard

UNIT PRICE #3 MASS ROCK REMOVAL
Description: Mass rock removal shall be paid for as noted and specified in the Contract Documents to include, but not limited to all fees and costs to provide all equipment and materials, and manpower to excavate, and legally dispose of mass rock, and backfill with acceptable material within the limits of excavation, and compact and test the soil in the project limits.

Unit of Measurement: Cubic Yard

UNIT PRICE #4 TRENCH ROCK REMOVAL
Description: Trench rock removal shall be paid for as noted and specified in the Contract Documents to include, but not limited to all fees and costs to provide all equipment and materials, and manpower to excavate, and legally dispose of trench rock, and backfill with acceptable material within the limits of excavation, and compact and test the soil in the project limits.
Unit of Measurement: Cubic Yard

4.2 COMPENSATION FOR ACTUAL QUANTITIES

When the actual quantities of work vary from the estimated quantities, the Contractor shall accept as payment in full, so far as pay items are concerned, payment at the unit price for the quantities of work actually completed and accepted. No allowance will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor which results directly or indirectly from its unbalanced allocation of overhead and profit among the pay items, or from any other cause.

4.3 PARTIAL PAYMENT/RETAINAGE

Contractor may submit requests for payment every 30 days or at such longer intervals as the Contractor may choose. Notwithstanding, however, Contractor may not request payment when the amount due the Contractor since the last request amounts to less than five hundred dollars.

Partial payments will be made based upon estimates, prepared by the Contractor and approved by Owner, of the value of the Work performed and materials complete in place in accordance with the Contract Documents. Such partial payments may also include the delivered actual cost of those materials stockpiled and stored in accordance with the subsection titled PAYMENT FOR MATERIALS ON HAND of this section.

From the total of the amount determined to be payable on a partial payment, ten percent (10%) of such total amount will be deducted and retained by the Owner until the final payment is made. The balance (90%) of the amount payable, less all-previous payments, shall be certified for payment. [Refer to G.S. 143-134.1 re whether retainage is permitted on each particular project.]

The Owner will pay, reject or request additional support for each pay request within 30 days after receipt. Late payments shall be subject to interest charges calculated at the rate of 8% per year from and after the date due until paid.

No partial payment shall bind the Owner to the acceptance of any materials or work in place as to quality or quantity. All partial payments are subject to correction at the time of final payment as provided in the subsection titled ACCEPTANCE AND FINAL PAYMENT of this section.

4.4 TAX STATEMENT SUBMITTAL

A statement of state sales/use tax statement form must always accompany each request for payment.

4.5 PAYMENT FOR MATERIALS ON HAND

Partial payments may be made to the extent of the delivered cost of materials to be incorporated in the work, provided that such materials meet the requirements of the Contract Documents and are delivered to acceptable sites. Such delivered costs of stored or stockpiled materials may be included in the next partial payment after the following conditions are met:

A. The material has been stored or stockpiled in a manner acceptable to the Owner at or on an approved site.

B. The Contractor has furnished the Owner with acceptable evidence of the quantity and quality of such stored or stockpiled materials.

C. The Contractor has furnished the Owner with satisfactory evidence that the material and transportation costs have been paid.

D. The Contractor has furnished the Owner legal title (free of liens or encumbrances of any kind) to the material so stored or stockpiled.

E. The Contractor has furnished the owner evidence that the material so stored or stockpiled is insured against loss by damage to or disappearance of such materials at anytime prior to use in the work.

F. The value of the delivered material is to be used in one item of work exceeds $3,000 and is not scheduled to be incorporated into the Work within 60 days after delivery.

It is understood and agreed that the transfer of title and the Owner's payment for such stored or stockpiled materials shall in no way relieve the Contractor of his/her responsibility for furnishing and placing such materials in accordance with the requirements of the Contract Documents.

In no case will the amount of partial payments for materials on hand exceed the Contract Price for such materials or the Contract Price for the pay items in which the material is intended to be used.

No partial payment will be made for stored or stockpiled living or perishable plant materials.

The Contractor shall bear all costs associated with the partial payment of stored or stockpiled materials in accordance with the provisions of this subsection.

4.6 ACCEPTANCE AND FINAL PAYMENT

When the Work has been accepted in accordance with the requirements of the subsection titled FINAL ACCEPTANCE, the Owner shall determine the actual quantities of the items of work actually performed. The Contractor shall approve the Owner’s statement of actual quantities or advise the Owner of his/her objections which are based on disputes in measurements or computations of the final quantities. The Contractor and the Owner shall resolve all disputes (if any) in the measurement and computation of final quantities to be paid within 30 calendar days of the Contractor's receipt of the Owner’s final statement of

actual quantities. If, after such 30-day period, a dispute still exists, the Contractor may approve the Owner's statement of actual quantities under protest of the quantities in dispute, and such disputed quantities shall be considered by the Owner as a claim in accordance with the subsection titled CLAIMS FOR ADJUSTMENT AND DISPUTES.

After the Contractor has approved, or approved under protest, the Owner's statement of actual quantities, final payment will be processed based on the entire sum, or the undisputed sum in case of approval under protest, determined to be due the Contractor less all previous payments and all amounts to be deducted under the provisions of the contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

4.7 LIENS

Neither the final payment nor any part of the retained percentage shall become due until the Contractor delivers to the Owner: (a) an affidavit stating, if that be in fact, that all subcontractors and suppliers have been paid in full, or if the fact be otherwise, showing the name of each subcontractor and supplier who has not been paid in full and the amount due or to become due each for labor, service or material furnished; (b) consent of surety, if any, to final payment; and (c) if required by Owner, other data establishing payment for satisfaction of all obligations, such as receipt, releases, and waivers of lien arising out of the Contract to the extent and in such form as designated by the Owner.

4.8 CLAIMS FOR ADJUSTMENT AND DISPUTES

If for any reason the Contractor deems that additional compensation is due him for work or materials not clearly provided for in the Contract Documents or previously authorized as Extra Work, he shall notify the Owner in writing of his/her intention to claim such additional compensation before he begins the work on which he bases the claim. If such notification is not given or the Owner is not afforded proper opportunity by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor and the fact that the Owner has kept account of the cost of the work shall not in any way be construed as proving or substantiating the validity of the claim. When the work on which the claim for additional compensation is based has been completed, the Contractor shall, within 10 calendar days, submit his/her written claim to the Owner and the Engineer. Failure to do so within the time specified will constitute a waiver by Contractor of the claim.

Nothing in this subsection shall be construed as a waiver of the Contractor's right to dispute final payment based on differences in measurements or computations.

The following documentation and information must be presented in order to properly evaluate such claim:

A. Definition of the basis of the claim, including a detailed identification of which materials and what work is considered to represent a change to the original contract, an explanation of why the work or material is different than what was called for by the original Contract, and an identification of the contract provisions and anything else which the Contract relied upon;

B. An explanation of how and why the work which is considered a change will result in any additional cost or performance time for the Contractor;

C. An identification of the categories of additional costs which may be incurred, an estimate of the dollar magnitude of each, and a statement of the impact this work will have on the construction schedule, including the contract completion dates;

D. An indication of how the additional costs which is believed that may be incurred can be, and are to be, quantified;

E. Documentation of any actual additional costs and any actual impact to the construction schedule due to this work;

F. Documentation of the cost of performing all similar "unchanged" work, to provide the Engineer a basis for comparison;

G. All backup and other documentation which are believed to support or relate to the claim;

H. Documentation quantifying the amount of work which is believed to constitute this "changed" Work, and the time period and the areas where such work was or is to be performed.

4.9 CORRECTION OF WORK AFTER FINAL PAYMENT

Neither the final certificate nor payment, nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship and, unless otherwise specified, he shall remedy any defect due thereto and pay for any damage to other Work resulting therefrom, which shall appear within a period of one year from date of final acceptance. Wherever the word "acceptance" occurs, it shall be understood to mean final acceptance.

The Owner shall give notice of observed defects with reasonable promptness. If the Contractor fails to remedy any failure, defect, or damage within a reasonable time after the receipt of notice, the Owner shall have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense. With respect to all warranties, expressed or implied, from subcontractors, manufacturer, or suppliers for Work performed and materials furnished under this Contract, the Contractor shall:

A. Obtain all warranties that would be given in normal commercial practice.

B. Require all warranties to be executed, in writing, for the benefit of the Owner.

END OF MEASUREMENT AND PAYMENT

V. MISCELLANEOUS

5.1 VENUE

This Contract has been executed by, delivered to and accepted by the Owner in North Carolina, and the provisions hereof shall be governed by the laws of North Carolina. Any disputes arising out of or related to this Contract shall be resolved in accordance with said laws.

The parties agree that any action or legal proceeding arising out of or related to this Contract shall be brought in the state courts of Union County, NC, or in the U.S. District Court for the Western District of North Carolina; and the parties hereby consent to and waive any objection to jurisdiction or venue in said courts.

5.2 INDEPENDENT CONTRACTOR

Contractor represents that it is fully experienced and properly qualified to perform the class of work provided for herein, and that it is properly licensed, equipped, organized and financed to perform such work. Contractor shall act as an independent contractor and not as the agent of Owner in performing the Contract, maintaining complete control over its employees and all of its suppliers and subcontractors. Nothing contained in this Contract or any subcontract awarded by Contractor shall create any contractual relationship between any such supplier or subcontractor and Owner.

5.3 LAWS AND REGULATIONS

Contractor and its employees and representatives shall at all times comply with all applicable laws, ordinances, statutes, rules or regulations in effect at the time Work is performed under this Contract.

5.4 INDEMNITY

Contractor agrees to defend, indemnify and hold harmless the Owner, its officers, employees and agents from any and all claims, suits, actions, damages, expenses ,costs (including attorneys' fees if applicable) or fines, arising from Contractor's performance of this Contract; provided that Contractor shall not be liable for any injury, damage or loss occasioned by the sole negligence of Owner, its officers, employees or agents. Contractor shall purchase insurance, as described in this Section, which insurance shall provide coverage for this contractual liability. In any case in which Contractor provides a defense to the Owner, its officers, employees or agents, pursuant to his indemnity, the defense will be provided by attorneys reasonably acceptable to the Owner. The provisions of this Section shall survive the expiration or early termination of this Agreement.

5.5 INSURANCE

5.5.1 Commercial General Liability Insurance. Contractor shall maintain in force during the term of this Contract commercial general liability insurance, in an amount acceptable to Owner but no less than One Million Dollars ($1,000,000) per occurrence. This insurance shall include coverage for products/completed operations, bodily injury, personal injury, property damage and the contractual liability assumed under the indemnity provision of the Contract. The policy shall be occurrence-based and name the Owner as an additional insured.

5.5.2 Vehicle Liability Insurance. Contractor shall maintain in force during the term of this Contract liability insurance covering the operations of Contractors' owned, non-owned and hired

automobiles and other ground vehicles, for limits satisfactory to Owner but not less than One Million Dollars ($1,000,000) bodily injury and property damage each occurrence. The policy shall be occurrence-based and name the Owner as an additional insured.

5.5.3 Worker's Compensation and Employer's Liability Insurance. Contractor shall maintain worker's compensation and employer's liability insurance in the amounts and form required by the laws of the State of North Carolina.

5.5.4 A certificate evidencing all insurance coverage required of Contractor shall be filed with the Owner at the execution of this Contract, and such certificate shall provide that such insurance coverage will not be canceled or reduced without at least thirty (30) day's prior written notice to the Owner. At least ten (10) days prior to the expiration of any such policy, a certificate showing that such coverage has been renewed shall be filed with the Owner. If such insurance coverage is canceled or reduced, the Contractor shall within fifteen (15) days after receipt of written notice from the Owner of such cancellation or reduction in coverage, file with the Owner a certificate showing the required insurance has been reinstated or provided through another insurance company or companies. The company or companies furnishing insurance shall be qualified to issue insurance effective in the State of North Carolina.

5.5.5 Payment and Performance Bonds. Contemporaneously with Contractor's execution of the Contract Documents, Contractor shall supply the Owner with a performance bond and a payment bond, each in an amount equal to the estimated Contract Price.

5.6 CONTRACT MEETINGS

The Contractor shall, as requested by Owner, attend any and all meetings called by Owner to discuss the Work. Such meetings shall be conducted and recorded by the Contractor with minutes of each meeting distributed to Owner and Contractor.

5.7 SUCCESSORS, ASSIGNEES AND ASSIGNMENT

Contractor shall not assign, transfer, convey or otherwise dispose of the Contract or its right, title or interest in or to the same or any part thereof, without previous written consent of the Owner and concurred to by the sureties.

5.8 AUDIT RIGHTS

The Owner shall have the right to inspect, examine and make copies of any and all books, accounts, records, and other writings of contractors relating to the performance of the Work under the Contract, including change orders. Such audit rights shall be extended to any duly authorized representatives designated by the Owner. Audits shall take place at times and locations mutually agreed upon by both parties, but not later than one week following the date of a request for an audit.

END OF MISCELLANEOUS

MBE GUIDELINES and FORMS

OUTREACH PLAN AND GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES ("Guidelines") FOR PARTICIPATION IN CERTAIN VILLAGE OF MARVIN CONTRACTS

In accordance with G.S. § 143-64.31, G.S. § 143-128.2 and G.S. § 143-133, these Guidelines establish (i) goals for minority participation in building construction or repair contracts in the amount of $300,000 or more, (ii) outreach efforts to solicit minority participation in building construction contracts in the amount of $30,000 up to $300,000, and (iii) outreach efforts to solicit minority participation in contracts for architectural, engineering, and Project Architect -at-risk services.

With regard to building construction and repair contracts in the amount of $300,000 or more, the Village of Marvin ("Village") currently has a program goal of 10% percent for minority participation. The goal will be reviewed as needed or as soon as relevant data is available.

SECTION A: INTENT

It is the intent of these guidelines that the Village do all things legal, proper, and reasonable to achieve participation by minority businesses in those contracts subject to G.S. § 143-64.31, G.S. § 143-128.2 and G.S. § 143-133. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not meet the other statutory criteria for award.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
   a. Black, that is, a person having origins in any of the black racial groups in Africa;
   b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
   c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
   d. American Indian, that is, a person having origins in any of the original peoples of North America; or
   e. Female

2. Minority Business (MBE) - means a business:
   a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
   b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.

3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637: Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities. Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to

compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged.

4. Owner – Village of Marvin or ("Village")

5. Designer – Any person, firm, partnership, or corporation which has contracted with the Village to perform architectural or engineering work.

6. Bidder – (i) Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract directly from the Village, or (ii) any first-tier subcontractor for Project Architect at risk projects.

7. Contract - A mutually binding legal relationship or any modification thereof obligating the seller to furnish equipment, materials, or services, including construction, and obligating the buyer to pay for them.

8. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the Village to perform building construction or repair work.

9. Subcontractor - A firm under contract with the prime contractor or Project Architect at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

10. Eligible Contracts – A contract for the repair or construction of a building, which is expected to be for $300,000 or more, and which is bid under any of the methods authorized under G.S. 143-128(a1).

SECTION C: MINORITY OUTREACH PLAN AND GUIDELINES

Minority Business Responsibilities

CERTIFICATION

The Village does not certify minority, disadvantaged or women-owned businesses. Any business that desires to participate as an MBE will be required to complete and submit for certification, documents required by any of the agencies listed below. Only those firms holding current certification through at least one of the following agencies will be considered eligible for inclusion in meeting the MBE participation percentage goals:

North Carolina Department of Administration Historically Underutilized Business (HUB) certification
North Carolina Department of Transportation Minority/Disadvantaged/Women-owned Business certification
Small Business Administration 8(a) certification
Other governmental agencies on a case-by-case basis

Other Responsibilities

Minority businesses that are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

Owner Responsibilities

The Village will employ the following strategies to encourage participation from MBEs.

1. Work with minority-focused and small business groups that support MBE inclusion in the solicitation of bids for building construction and repair projects and in the solicitation for architectural, engineering, and Project Architect -at-risk services.

2. Place emphasis on the importance of soliciting certified MBE firms for subcontracting opportunities at pre-bid conferences and in the bid documents.

3. Examine specifications to identify special subcontracting opportunities and strongly encourage prime contractors to solicit bids for subcontracts from MBE firms.

4. Require all bidders to make good faith efforts to obtain minority participation on all Eligible Contracts.

5. Establish a percentage goal for minority participation in an Eligible Contract if, in the Village's reasonable belief, such a goal is achievable.

6. Provide detailed information to majority contractors concerning the bidding and good faith efforts requirements by holding meetings with the contractors.

7. Build new and strengthen existing business relationships through networking. Continue communicating with other North Carolina public agencies to find out how their MBE outreach programs are working and to share "best practices" and ideas to improve programs.

8. Participate in educational opportunities throughout the community as they become available and offer training sessions to share the Village's outreach plan with interested businesses and organizations

9. Be visible through participation in trade shows and business organizations of interest to MBE firms, majority contractors, and small businesses, and provide information to the general public about the MBE program, and continue outreach efforts to the business community.

10. Enhance the Village's web page by including the outreach plan and guidelines, listing good faith efforts, creating links to MBE resources, and creating awareness of specific subcontracting opportunities.

11. Make available to minority-focused agencies and minority businesses that have requested notices a list of contracting opportunities when they are identified, no later than 10 days prior to the bid opening. The list shall include a description of the work, important bidding information, contact information for questions, where the bid documents may be reviewed, and a list of prime bidders that subcontractors may wish to contact for subcontracting consideration.

12. Maintain or continue to maintain a database specifically for MBE firms and majority contractors to ensure those firms wishing to do business with the Village have access to up-to-date information.

13. Advertise upcoming bid opportunities in minority-focused media.

14. Work with designers to make subcontracting opportunities more noticeable and more easily understood by potential contractors and subcontractors.

Designer responsibilities

For all Eligible Projects the designer will:

1. Attend the scheduled pre-bid conference to explain minority business requirements to the prospective bidders.

2. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.

3. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.

4. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) and these Guidelines (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

5. During construction phase of the project, review documentation for contract payment to MBEs (Form 6, attached) for compliance with minority business utilization commitments. Submit this form with monthly pay applications to the Owner.

Responsibilities of Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors

On all Eligible Contracts, the Bidders will:

1. Attend the scheduled pre-bid conference.

2. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.

3. During the bidding process, comply with the owner's requirements listed in the proposal for minority participation.

4. Submit with the Bid (i) the minority businesses that will be utilized on the project with corresponding total dollar value of the bid (MBE Form 1, attached) and (ii) an affidavit listing Good Faith Efforts (MBE Form 2, attached), or an affidavit of intent to self-perform (MBE Form 3). See below for full description of Good Faith Efforts.

5. Upon being named the apparent low bidder, the bidder shall provide the following: (1) an affidavit that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal (MBE Form 4, attached); and (2) if there is a contract goal and the participation percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal (MBE Form 5, attached). The documentation must include evidence of all good faith efforts that were implemented including any advertisements, solicitations, and evidence of other specific actions demonstrating recruitment and selection of minority businesses for participation in the contract. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.

6. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values.

7. The contractor(s) shall submit with each monthly pay request(s) and final payment(s) documentation for contract payment to MBEs (MBE Form 6, attached)

8. During the construction of a project, at any time**,** if it becomes necessary to replace a minority business subcontractor, immediately advise the owner in writing**,** of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.

9. If during the construction of a project additional subcontracting opportunities become available, the contractor shall make a good faith effort to solicit sub-bids from minority businesses.

10. Make documentation showing evidence of implementation of Prime Contractor, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by the Village, upon request.

11. All written statements or affidavits made by the Bidder shall become a part of the agreement between the Contractor and the Village for performance of the contract. Failure to comply with any of these statements, affidavits, or with the minority business guidelines shall constitute a breach of the contract. A finding by the Village that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false, or incomplete shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the Village whether to terminate the contract for breach.

SECTION D: GOOD FAITH EFFORTS

In determining whether a contractor has made good faith efforts, the Village will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, diligence, and results of these efforts. At least five of the following 10 good faith efforts must be made in order to satisfy the Good Faith Efforts Requirement.

1. Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.

2. Making the construction plans, specifications, and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.

3. Breaking down or combining elements of work into economically feasible units to facilitate minority participation.

4. Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.

5. Attending any pre-bid meetings scheduled by the public owner.

6. Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.

7. Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Reasons for rejection of a minority business based on lack of qualification should be documented in writing.

8. Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

9. Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash flow demands.

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Identification of Minority Business Participation

I, _____
(Name of Bidder)

do hereby certify that on this project, we will use the following minority business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**), American Indian (**I**), Female (**F**), Socially and Economically Disadvantaged (**D**)

The total value of minority business contracting will be ($) _____.

MBE Form 1
ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Village of Marvin
"GOOD FAITH EFFORT"

COUNTY OF _____

AFFIDAVIT OF _____
(Name of Bidder)

I have a good faith effort to comply under the following areas checked:
(A minimum of 5 areas must be checked Yes in order to have achieved a "good faith effort")

(Y/N)

_____ (1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.

_____ (2) Making the construction plans, specifications and requirements available for review by prospective minority businesses or providing these documents to them at least 10 days before the bid or proposals are due.

_____ (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.

_____ (4) Working with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.

_____ (5) Attending any probed meetings scheduled by the public owner.

_____ (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.

_____ (7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of minority business based on lack of qualification should have the reasons documented writing.

_____ (8) Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily is required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

_____ (9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

_____ (10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

In accordance with GS143-128.2(d) the undersigned will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certified that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

[Seal]

Title: _____

State of North Carolina,
County of _____
Subscribed and sworn to before me this _____ day of _____, 20_____.
Notary Public _____
My commission expires _____

MBE Form 2

ATTACH TO BID ATTACH TO BID ATTACH TO BID ATTACH TO BID

Village of Marvin

Intent to Perform Contract With Own Workforce

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the

_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____ Name of Authorized Officer: _____

Signature: _____

[Seal] Title: _____

State of North Carolina

County of _____

Subscribed and sworn to before me

this _____ day of _____, 20____.

Notary Public _____

My commission expires. _____

MBE Form 3

Village of Marvin **-Portion of the Work to be Performed by Minority Firms**

******(NOTE: THIS FORM IS NOT TO BE SUBMITTED WITH THE BID PROPOSAL)******

If the portion of the work is to be executed by minority businesses as defined in GS 143-128.2 (g) is equal to or greater than 5% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within 72 hours after notification of being low bidder.

Affidavit of: _____ I do hereby certify that on the
(Bidder)

_____
(Project Name)

Project ID# _____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority Businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets if required.

Name and Phone Number	*Minority Category	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**), American Indian (**I**), Female (**F**), Socially and Economically Disadvantaged (**D**)

Pursuant to GS 143-128.2 (d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

MBE Form 4

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder t the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

[Seal]

Title: _____

State of North Carolina,
County of _____
Subscribed and sworn to before me this _____ day of _____, 20_____.
Notary Public _____
My commission expires _____

MBE Form 4

Village of Marvin -Good Faith Efforts

If the contract for goal participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts.

Affidavit of: _____
(Bidder)

I do certify the attached documentation as true and accurate representation of my good faith efforts.

Minority firms contacted by Bidder
(Attach additional sheets if required.)

Name and Phone Number	*Minority Category	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**), American Indian (**I**), Female (**F**), Socially and Economically Disadvantaged (**D**)

Documentation of the Bidder's good faith efforts to meet the goals set forth in these provisions. Examples of documentation shall include the following evidence:

A. Copies of solicitation for quotes to at least three (3) minority business firms form the source listed provided for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contract, and location, date and time when quotes must be received.
B. Copies of quotes or responses received from each firm responding to the solicitation.
C. A telephone log of follow-up calls to each firm sent a solicitation.
D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
F. Copy of pre-bid roster.
G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
H. Letter detailing reasons for rejection of minority business due to lack of qualification.
I. Letter documenting proposed assistance offered to minority businesses in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

MBE Form 5

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Date: _____ Name of Authorized Officer: _____

Signature: _____

[Seal]

Title: _____

State of North Carolina,
County of _____
Subscribed and sworn to before me this _____ day of _____, 20_____.
Notary Public _____
My commission expires _____

MBE Form 5

Village of Marvin

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application#: _____ Period: _____

The following is a list of payments to be made to minority business contractors on this project for the above-mentioned period.

Firm Name	*Minority Category	Payment Amount	Owner Use Only

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**), American Indian (**I**), Female (F), Socially and Economically Disadvantaged (D)

Date: _____ Approved/Certified By: _____
Name

_____
Title

_____
Signature

**THIS DOCUMENT MUST BE SUMITTED WITH EACH PAY REQUEST & FINAL PAYMENT

MBE Form 6
DISPUTE RESOLUTION REQUIREMENTS

DISPUTE RESOLUTION REQUIREMENTS ("Requirements") FOR CERTAIN VILLAGE OF MARVIN CONTRACTS

In accordance with N.C.G.S. § 143-128 (f1), these Requirements establish the dispute resolution process for all Village building construction projects that cost over $300,000, exclusive of land acquisition and design costs ("Eligible Projects").

This dispute resolution process will be available to all parties involved in the Village's Eligible Projects, including the Village, the architect, the Project Architect , the contractors, and the first-tier and lower-tier subcontractors. Therefore, it is the Village's policy that the following clauses are hereby made part of all contracts executed by the Village on Eligible Projects.

1. It is understood and agreed that NCGS 143-128(g-h) requires that disputes arising under an agreement for the erection, construction, alteration or repair of a building be subject to a dispute resolution process specified by the owner. In compliance with this statutory provision, the Village specifies this Article as the dispute resolution process to be used on this Project. It is further understood and agreed that this dispute resolution process is based on non-binding mediation and will only be effective to the extent that the Parties to any mediated dispute participate in the mediation in good faith. It is also understood and agreed that the Village is under no obligation under any circumstance to secure or enforce the participation of any other Party in the mediation of any dispute subject to this Article and GS 143-128(g-h).

2. Any dispute arising between or among the Parties listed in Section 4 of this Article that arises from an agreement to construct the Project, including without limitation a breach of such agreement, shall be subject to mediation mutually agreed upon by both parties. The mediation provided in this Article shall be used pursuant to this Agreement and GS 143-128(g-h) and is in lieu of any dispute resolution process adopted by the North Carolina State Building Commission, which process shall not apply to this Project.

3. For purposes of this Article the following definitions shall apply:

   Construct or *construction* refers to and includes the erection, construction, alteration or repair of the Eligible Project; and

   Party or *Parties* refers to the parties listed in Section 4 of this Article.

4. The Village and any Party contracting with the Village or with any first-tier or lower-tier subcontractor for the construction of the Eligible Project agree to participate in good faith in any mediation of a dispute subject to this Article and GS 143-128(g-h), including without limitation the following Parties (if any): architect(s), engineer(s), surveyor(s), Project Architect , Project Architect at risk, prime contractor(s), surety(ies), subcontractor(s), and supplier(s).

5. In order to facilitate compliance with GS 143-128(g-h), all Parties shall include this Article in every agreement to which it (any of them) is a Party for the Eligible Project without variation or exception. Failure to do so will constitute a breach of contract, and the Party failing to include this Article in any agreement required by this Article shall indemnify and hold harmless the remaining Parties from and against any and all claims, including without limitation reasonable attorney fees and other costs of litigation, arising in any manner from such breach. Notwithstanding the foregoing provisions of this Section, it is expressly understood and agreed that the Parties are intended to be and shall be third-party beneficiaries of the provisions of this Article and can enforce the provisions hereof.

6. a. The following disputes are not subject to mediation:

   i. A dispute seeking a non-monetary recovery; and

   ii. A dispute seeking a monetary recovery of $15,000 or less.

   b. A dispute seeking the extension of any time limit set forth in an agreement to construct the Project shall be subject to mediation pursuant to this Article and GS 143-128(g-h), but only if the damages which would be suffered by the Party seeking the extension would exceed $15,000 if the disputed extension is denied. To the extent that liquidated damages are set forth in such agreement as the measurement of damages for failure by such Party to meet such time limit, such liquidated damages shall be the exclusive standard for determining the amount of damages associated with such dispute.

7. For purposes of this Article, a dispute is limited to the recovery of monetary damages from the same transaction or occurrence against a single Party or two or more Parties alleged to be liable jointly, severally or in the alternative. Two or more disputes may not be consolidated or otherwise combined without the consent of all Parties to such disputes.

8. In addition to such matters as are required by the Rules, a request for mediation shall include the amount of the monetary relief requested.

9. Prior to requesting mediation, a Party must form a good faith belief that it is entitled under applicable law to recover the monetary amount to be included in the request from one or more of the remaining Parties. Such belief must be based on a reasonable and prudent investigation into the dispute that is the subject of the request. The request for mediation must be based on such investigation and may not include any amount or the name of any remaining Party, unless supported by such investigation and good faith belief by the Party requesting the mediation.

10. If a Party breaches any provision of Section 9, it shall indemnify and hold harmless all other Parties from any costs, including reasonable attorney fees and other costs of litigation, and damages incurred by such other Parties that arise from such breach.

11. All expenses incurred by a Party to a dispute in preparing and presenting any claim or defense at the mediation shall be paid by the Party. Such expenses include without limitation preparation and production of witnesses and exhibits and attorney fees. All other expenses of the mediation, including filing fees and required traveling and other expenses of the mediator, shall be borne as follows: one half by the Party requesting the mediation, with the remaining parties paying equal

shares of the remaining expenses and costs; provided that, if the Village is named as a party to the mediation, the Village shall pay at least one-third of the mediation expenses and costs divided among the Parties. If more than one Party to a dispute requests a mediation, the mediation expenses and costs to be divided among the Parties shall be borne equally by the Parties to the dispute; provided that, if the Village is named as a party to the mediation, the Village shall pay at least one-third of the mediation expenses and costs divided among the Parties.

12. The mediation shall be held at a location agreeable to the mediator and all of the Parties; provided that, if no agreement can be reached, the mediation will be held at such location in Union County, as the mediator shall determine.

13. The provisions of this Article are subject to any other provision of this Agreement concerning the submission, documentation and/or proof of any claim or dispute. Such other provisions shall apply in full force and shall be satisfied as a condition precedent to mediation pursuant to this Article.

14. The Parties understand and agree that mediation in accordance with this Article shall be a condition precedent to institution of any legal or equitable proceeding seeking monetary recovery based on any dispute that is subject to mediation pursuant to this Article.

SPECIFICATIONS

Contractors shall adhere to the specifications in the project plans including, but not limited to, sheets SP1-SP3.

Contractors shall follow the latest version of the North Carolina Building Code.

APPENDICES

1. AIA® Document A101TM – 2017 Standard Form of Agreement Between Owner and Contractor
2. AIA® Document A101TM – 2017 Exhibit A Insurance and Bonds
3. AIA® Document A201TM – 2017 General Conditions of the Contract for Construction
4. Civil, Water & Sewer, and Building Plans

SECTION 02 41 15 – TREE PROTECTION & TRIMMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

B. Related Sections include the following:
   1. Division 31 Section "Site Clearing" for removal limits of trees, shrubs, and other plantings affected by new construction.
   2. Division 31 Section "Earth Moving" for building and utility trench excavation, backfilling, compacting and grading requirements, and soil materials.
   3. Division 32 Section "Exterior Plants" for tree and shrub planting, tree support systems, and soil materials.

1.3 DEFINITIONS

A. Tree Protection Zone: Area surrounding individual trees or groups of trees to remain during construction and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Tree Pruning Schedule: Written schedule from arborist detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

C. Qualification Data: For tree service firm and arborist.

D. 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.

E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.

1.5 QUALITY ASSURANCE

A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of tree protection and trimming.

B. Arborist Qualifications: An arborist certified by ISA or licensed in the jurisdiction where Project is located.

C. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance--Standard Practices (Pruning)."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before tree protection and trimming operations begin, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities to review tree protection and trimming procedures and responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other non-soil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

D. Chain-Link Fence: Metallic-coated steel chain-link fence fabric of 0.120-inch-diameter wire; a minimum of 48 inches high; with 1.9-inch-diameter line posts; 2-3/8-inch-diameter terminal and corner posts; 1-5/8-inch-diameter top rail; and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

E. Organic Mulch: Double hammered hardwood, free of deleterious materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Fencing: Install temporary fencing around tree protection zones to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.

1. Install chain-link fence according to ASTM F 567 and manufacturer's written instructions.

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. Mulch areas inside tree protection zones and other areas indicated.

1. Apply 3-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

D. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.

E. Maintain tree protection zones free of weeds and trash.

F. Do not allow fires within tree protection zones.

3.2 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

1. 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.
2. 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.

D. Where utility trenches are required within tree protection zones, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp pruning instruments; do not break or chop.

3.3 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree protection zones. Maintain existing grades within tree protection zones.

B. Grade Lowering: 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 during grade lowering. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop.

C. Minor Fill: Where existing grade is 6 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

D. Moderate Fill: 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 as follows:

1. Carefully place drainage fill against tree trunk approximately 2 inches above elevation of finish grade and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip-line perimeter, place drainage fill up to 6 inches below elevation of grade.
2. Place filter fabric with edges overlapping 6 inches minimum.
3. Place fill layer of topsoil to finish grade. Do not compact drainage fill or topsoil. Hand grade to required finish elevations.

3.4 TREE PRUNING

A. Prune trees to remain that are affected by temporary and permanent construction.

B. 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.

C. Pruning Standards: Prune trees according to ANSI A300 (Part 1).

D. Cut branches with sharp pruning instruments; do not break or chop.

E. Chip removed tree branches and spread over areas identified by Architect.

3.5 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

B. Remove and replace trees indicated to remain that die or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size and species as those being replaced; plant and maintain as specified in Division 32 Section "Exterior Plants."
2. Provide new trees of 6-inch caliper size and of a species selected by Architect when damaged trees more than 6 inches in caliper size, measured 12 inches above grade, are required to be replaced. Plant and maintain new trees as specified in Division 32 Section "Exterior Plants."

C. Aerate surface soil, compacted during construction, 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 augered soil and sand.

3.6 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material and displaced trees from Owner's property.

END OF SECTION 02 41 15

SECTION 02 41 19 – SITE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes demolition and removal of the following:

1. Existing concrete and asphaltic paving, curbs, sidewalk, piping, underground utilities, and miscellaneous storm structures within the proposed area of construction shall be completely demolished and removed from the site.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or recycled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.04 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during building demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.05 SUBMITTALS

A. Qualification Data: For the following:

1. Demolition firm.

B. Proposed Protection and Control Measures: Submit statement or drawing that indicates the proposed measures, locations, and time frame for operation and implementation. Propose options in cases the proposed measures are later identified to be inadequate. Include measures for the following:

1. Environmental protection.

2. Dust control.

3. Noise control.

C. Schedule of Demolition Activities: Indicate detailed sequence of demolition and removal work, with starting and ending dates for each activity, interruption of utility services, and locations of temporary protection and means of egress.

D. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by building demolition operations.

E. Submit before Work begins.

1. Landfill Records: Indicate receipt and acceptance of wastes by a landfill facility licensed to accept wastes from the project site.

1.06 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.07 PROJECT CONDITIONS

A. Provide not less than 10 days notice to Owner of activities that will affect Owner’s operations.

B. Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.

1. Do not close or obstruct walkways, exits, roads, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for structures to be demolished.

D. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

E. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

F. Hazardous materials will be removed by Owner before start of the Work.

G. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.

H. Storage or sale of removed items or materials on-site is not permitted.

1.08 COORDINATION

A. Arrange demolition schedule so as not to interfere with Owner's on-site operations.

PART 2 - NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.

B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

C. Inventory and record the condition of items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to Owner.

E. Perform an engineering survey of condition of dam to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.

F. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.02 PREPARATION

A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.

B. Arrange to shut off indicated utilities with utility companies.

C. If utility services are required to be removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.

D. Cut off pipe or conduit a minimum of 24 inches (610 mm) below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing. Demolish and completely remove from site existing underground utilities indicated to be removed. If utilities cannot be removed due to existing field conditions they shall be filled with flowable fill (minimum 200psi) and noted as “Abandoned” on as-built drawings. However, in all cases the contractor shall demolish all utilities within the footprint of any proposed structure and within the area extending 5’ from the proposed building footprint.

E. Holes left in existing utility structures from removed utilities shall be plugged and patched as appropriate.

F. Existing Utilities: Refer to Division 32 and 33 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing

G. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

H. Removed and Salvaged Items: Comply with the following:

1. Clean salvaged items of dirt and demolition debris

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in 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.

I. Existing utilities to be abandoned in place shall be filled with flowable fill prior to sealing or capping ends. Abandoned utilities shall be identified on Contractor record drawings.

3.03 PROTECTION

A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by Owner, items may be removed to a suitable, protected storage location during demolition and cleaned and reinstalled in their original locations after demolition operations are complete.

C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.

D. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.

E. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 10 days notice to Owner if shutdown of service is required during changeover.

F. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.

G. Protect existing site improvements, appurtenances, and landscaping to remain.

H. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

I. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.

J. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.

3.04 DEMOLITION, GENERAL

A. General: Demolish indicated items within limits shown on the drawings. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.

2. Maintain adequate ventilation when using cutting torches.

3. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Engineering Surveys: Perform surveys as the Work progresses to detect hazards that may result from building demolition activities.

C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

D. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner or building manager and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

E. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.05 EXPLOSIVE DEMOLITION

A. Explosives: Use of explosives is not permitted.

3.06 SITE RESTORATION

A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in

Division 31 and 33 Sections.

B. General: Promptly repair damage to adjacent construction caused by building demolition operations.

C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

D. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.07 RECYCLING DEMOLISHED MATERIALS

A. General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.

B. Provide containers or other storage method approved by Engineer for controlling recyclable materials until they are removed from Project site.

C. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

D. Stockpile materials away from demolition area. Do not store within drip line of remaining trees.

E. Store components off the ground and protect from the weather.

F. Transport recyclable materials off Owner's property and legally dispose of them.

G. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling building demolition materials shall accrue to Contractor.

3.08 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Do not allow demolished materials to accumulate on-site.

C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

D. Burning: Do not burn demolished materials.

E. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.09 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 02 41 19

SECTION 31 10 00 – SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. The CONTRACTOR shall be responsible for preparing the site for construction in accordance with the Contract Documents and as specified herein.

1.3 REFERENCES

A. North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual, latest edition.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the site, store and handle them in a manner which will maintain their original manufactured or fabricated condition until ready for use.

PART 2 - (Not Used)

PART 3 - EXECUTION

3.1 TRAFFIC

A. Conduct site clearing operations to ensure minimum interference with roads, streets, walks, businesses, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without prior permission from Owner, NCDOT, and/or authorities having jurisdiction.

3.2 PROTECTION

A. General: Provide temporary fences, barricades, coverings, or other protection to preserve existing items indicated to remain and to prevent injury or damage to persons or property. Provide protection for adjacent properties as required.

B. Restoration/Repair: Restore damaged items to the condition existing prior to start of WORK.

C. Existing Trees/Vegetation: Protect existing trees and vegetation adjacent to the actual WORK area or borrow area from physical damage. Do not store equipment or materials within tree drip line.

D. Road and Walks: Keep roads and walks free of dirt and debris at all times.

E. Utility Lines: Protect existing utility lines that are indicated to remain from damage. Notify ENGINEER immediately of damage to or an encounter with unknown existing utility lines. CONTRACTOR shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to CONTRACTOR prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, CONTRACTOR shall notify ENGINEER and OWNER and Utility Owner within 10 days time to minimize interruption of the service.

3.3 EROSION/SEDIMENT CONTROL

A. Provide appropriate erosion and sediment control measures for all off-site borrow areas in full compliance with the North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual and regulations of the local jurisdiction. CONTRACTOR shall be solely responsible for all borrow sites outside of the Project area.

3.4 CLEARING

A. Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Cut off flush with or below the original ground surface trees, stumps, roots, brush, and other vegetation in areas to be cleared, except for trees and vegetation indicated or directed to be left standing. CONTRACTOR shall coordinate all clearing with OWNER prior to proceeding.

3.5 TREE REMOVAL

A. Where indicated or directed by OWNER, trim designated trees or remove designated trees and stumps and grub roots.

3.6 GRUBBING

A. Remove and dispose of roots larger than 3 inches in diameter, matted roots, and stumps from the indicated grubbing areas. Excavate this material together with logs, organic and metallic debris, brush, and refuse and remove to a depth of not less than 18 inches below the original soil surface in areas indicated to be grubbed and in areas indicated as construction areas for this Project. Fill depressions made by grubbing with suitable material and compact in accordance with the requirements of the Contract Documents to make the new surface conform with the existing adjacent surface of the ground.

3.7 DISPOSAL OF CLEARED AND GRUBBED MATERIALS

A. Nonsalable Materials: Disposal shall be CONTRACTOR's responsibility.

3.8 STORING MATERIALS

A. Strip and stockpile topsoil material and other cleared materials that will be reused in the WORK.

3.9 EXISTING IMPROVEMENTS/FACILITIES

A. Remove existing improvements, both above-grade and below-grade to extent indicated or as otherwise required to permit new construction and provide for proper disposal off-site. Existing improvements and facilities such as mailboxes, signs, ornamental or decorative items, etc. that require temporary removal to permit new construction shall be promptly replaced and/or restored to the location and condition prior to construction. Improvements and facilities that are damaged by the CONTRACTOR during the course of construction shall be promptly replaced at the CONTRACTOR's expense.

3.10 SALVABLE ITEMS

A. No salvable items are anticipated for this project.

3.11 FUGITIVE DUST

A. Control air pollution caused by dust and dirt; comply with governing regulations.

3.12 FILLING

A. Fill depressions and voids resulting from site clearing operations. Comply with the requirements of Specification Section 31 20 00, "Earth Moving".

3.13 GRADING

A. Grade ground surface to conform to required contours and to provide positive surface drainage away from the WORK or borrow area.

3.14 DISPOSAL

A. Dispose of waste materials, including trash and debris, and excess topsoil, legally off-site.

3.15 BURNING

A. Burning of waste materials is prohibited for this project.

END OF SECTION 31 10 00

SECTION 31 20 00 – EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Geotechnical report titled “Subsurface Exploration and Geotechnical Engineering Services” by Froehling & Robertson, Inc. dated September 20, 2024

C. North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures dated January 2024.

1.2 North Carolina Erosion and Sediment Control Planning and Design ManualSUMMARY

A. Prior to beginning construction, the Geotechnical Engineer should evaluate the subgrade soils for suitability based on observations of proof rolling with a loaded dump truck or other method considered acceptable to the Geotechnical Engineer. Fill meeting the requirements herein shall then be placed to the grade shown.

1.3 DEFINITIONS

A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.

B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

C. Borrow: Soil material obtained off site when sufficient approved soil material is not available from excavations.

D. Subbase Course: The layer placed between the subgrade and surface of a pavement or walk.

E. Design Subgrade: Elevation of bearing for foundations, bottom of porous fill beneath slabs on grade (4" below bottom of slab), bottom of turn down slabs, and bottom most portion of stairs and ramps.

F. Drainage Fill: Course of washed granular material supporting slab on grade placed to cut off upward capillary flow of pore water.

G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

I. Utilities include on site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

B. Test Reports: In addition to test reports required under field quality control, submit the following:

1. Laboratory analysis (including grain size and plasticity analyses) of each soil material proposed for fill and backfill from on site and borrow sources.
2. One Standard Proctor compaction test (moisture density relationship) in accordance with ASTM D698 for each soil material.

C. Submit excavation support system design and details for trench excavation.

1.5 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction. These include, but are not limited to, Village of Marvin, Union County, North Carolina Department of Environmental Quality (NCDEQ), and the State of North Carolina.

B. Testing and Inspection Service: Owner shall employ a qualified independent geotechnical engineering testing agency to classify proposed on site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

1.6 PROJECT CONDITIONS

A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided.

1. Provide a minimum 10 day notice to the Owner and receive written notice to proceed before interrupting any utility.

B. Demolish and completely remove from site existing underground utilities indicated to be removed. If utilities cannot be removed due to existing field conditions they shall be filled with flowable fill (minimum 200psi) and noted as “Abandoned” on as-built drawings. However, in all cases the contractor shall demolish all utilities within the footprint of any proposed structure and within the area extending 5’ from the proposed footprint. Coordinate with utility companies to shutoff services if lines are active.

C. Excavation support system design and details for trench excavation, shall be sealed and signed by a professional engineer licensed in the State of North Carolina, copy of design shall be filed with ENGINEER.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide approved borrow soil materials from off site when sufficient approved soil materials are not available from excavations. Contractor is responsible for locating appropriate off-site borrow areas.

B. Satisfactory Soil Materials:

1. Engineered Fill: Compacted structural fill should consist of material classified as CL, ML, SC, SM, or GW, per ASTM D 2487 and shall have a maximum liquid limit (LL) of 50 and a maximum plasticity index (PI) of 30. High plasticity soils such as CH and MH should not be used as engineered fill. The maximum particle size should not exceed 4 inches. Fill should be free of debris, waste, frozen materials, vegetation, and any other deleterious matter. Off-site borrow materials should have a CBR value no less than 6 percent or as otherwise noted in the field by the Owner's Geotechnical Engineer.

C. Unsatisfactory Soils: Soil Classification Groups including but not limited to CH and MH according to ASTM D 2487 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: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

E. Base Course: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

F. Engineered Fill: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

G. Bedding Course: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

H. Drainage Course: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

I. Filter Material: Shall be in accordance with NCDOT Standard Specifications for Roads and Structures dated January 2024.

J. BMP Embankment: Fill materials shall be complying with Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024, or as otherwise recommended by the Owner's Geotechnical Engineer based on field conditions.

K. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILE FABRIC

A. Geotextile Fabric installed between sand and stone in sand filter shall be as follows:

1. Weight: 4.0 oz/sy as per ASTM D-5261.
2. Grab Tensile Strength: 120 lbs as per ASTM D-4632-86.
3. Grab Tensile Elongation: 50% as per ASTM D-4632-86.
4. Trapezoid Tear Strength: 50 lbs as per ASTM D-4533-85.
5. CBR Puncture Strength: 310 lbs as per ASTM D-6241.
6. Apparent Opening Size: 70 U.S. Std. Sieve as per ASTM D-4751-87.
7. Permittivity: 1.7 sec(-1) as per ASTM D-4491-85.
8. Water Flow Rate: 135 gal/min/sf as per ASTM D-4491-85.
9. Ultraviolet Stability: 70% as per ASTM D-4355-84.

B. Geotextile Fabric installed underneath riprap aprons and riprap channels shall be as follows:

1. Grab Tensile Strength: 200 lbs as per ASTM D-4632-86.
2. Grab Tensile Elongation: 15% as per ASTM D-4632-86.
3. Trapezoid Tear Strength: 75 lbs as per ASTM D-4533-85.
4. CBR Puncture Strength: 700 lbs as per ASTM D-6241.
5. Apparent Opening Size: 40 U.S. Std. Sieve as per ASTM D-4751-87.
6. Permittivity: 0.05 sec(-1) as per ASTM D-4491-85.
7. Water Flow Rate: 4 gal/min/sf as per ASTM D-4491-85.
8. Ultraviolet Stability: 70% as per ASTM D-4355-84.

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 earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide 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.

D. Prior to proceeding with construction, all topsoil and other deleterious, non-soil materials shall be stripped from proposed construction area. Stripping shall extend at least 5 feet horizontally beyond building limits, and stripping of unsatisfactory soils shall be as identified by the Geotechnical Engineer.

E. Subgrades which are to support slabs, pavements, or compacted fill shall be proofrolled with a 20 to 30 ton fully loaded truck or other pneumatic-tired vehicle of similar size and weight to identify areas of localized soft soil or unsuitable soil. Any soft or unsuitable material encountered during proofrolling shall be removed and replaced with engineered fill. The Geotechnical Engineer shall observe all proofrolling operations.

1. The proofrolling procedures should consist of complete passes of the exposed area, with half of the passes being in a direction perpendicular to the preceding ones.

3.2 DEWATERING

A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

C. Dewatering disposal shall be in accordance with Erosion and Sediment Control permit.

3.3 EXCAVATION

A. Explosives: Do not use explosives.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, 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.

2. Excavation for Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb the bottom of excavations intended for bearing surface.

3.5 APPROVAL OF SUBGRADE

A. Notify Engineer when excavations have reached the required subgrade.

B. When Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Engineer.

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill or flowable fill may be used to bring elevations to proper position.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

3.8 BACKFILL

A. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.

2. Surveying locations of underground utilities for record documents.

3. Testing, inspecting, and approval of underground utilities.

4. Concrete form-work removal.

5. Removal of trash and debris from excavation.

6. Removal of temporary shoring and bracing, and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.9 SUBSURFACE DRAINAGE BACKFILL

A. Subsurface Drain: Place a layer of filter fabric around perimeter of drainage trench or at footing, as indicated. Place a 6 inch compacted course of filtering material on filter fabric to support drainage pipe. After installing and testing, encase drainage pipe in a minimum of 6 inches of compacted filtering material and wrap in filter fabric, overlapping edges at least 6 inches.

B. Drainage Backfill: Place and compact drainage backfill of filtering material over subsurface drain, in width indicated, to within 18 inches of final subgrade. Overlay drainage backfill with one layer of filter fabric, overlapping edges at least 6 inches.

C. Fill: Place and compact fill material over drainage backfill to final subgrade.

3.10 FILL

A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.

1. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.

B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to 8 inches, pulverize, moisture condition, or aerate soil and recompact to required density.

C. Place fill material in layers to required elevations for each location listed below.

1. Under grass, use General Site Fill.

2. Under walks and pavements, use aggregate base to the required depth and, General Site Fill.

3. Under steps and ramps, aggregate base.

4. Under building slabs, use porous fill to the required depth, and General Site Fill.

5. Under footings and foundations, use Engineered Fill, aggregate base, or flowable fill.

6. Behind below-grade walls, use Engineered Fill or porous fill.

3.11 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry satisfactory soil material that is too wet to compact to specified density.

a. Stockpile or spread and dry removed wet satisfactory soil material.

b. If excavation must remain open overnight or rainfall becomes imminent while the bearing soils are exposed, place a 1 to 3 inch thick “mud mat” of lean concrete on the bearing soils before the placement of reinforcing steel.

c. Costs associated with removing and replacing previously approved backfill due to being too wet shall be borne by the CONTRACTOR.

3.12 COMPACTION

A. Place backfill and fill 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 materials evenly on all sides of structures to required elevations. Place backfill and fill 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 D 698.

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 98 percent.

2. Under paved tennis and pickleball courts, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 100 percent.

3. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.

4. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.

5. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between existing adjacent grades and new grades.

2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.

2. Walks: Plus or minus 0.10 foot.

C. Grading Inside Building Lines: Finish subgrade to a tolerance of ½ inch when tested with a 10 foot straightedge.

3.14 POROUS FILL

A. Under slabs on grade, place porous fill course on prepared subgrade.

1. Compact porous fill to required cross sections and thickness.

3.15 BMP EMBANKMENT

A. Subgrade Preparation: Shall be in compliance with Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024 or as otherwise recommended by the Owner's Geotechnical Engineer based on field conditions.

B. Seepage Key Placement: Shall be in compliance with Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024 or as otherwise recommended by the Owner's Geotechnical Engineer based on field conditions.

C. Embankment Fill Placement: Shall be in compliance with Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024 or as otherwise recommended by the Owner's Geotechnical Engineer based on field conditions.

D. Outlet Pipe Fill Placement: Shall be in compliance with Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024 or as otherwise recommended by the Owner's Geotechnical Engineer based on field conditions.

3.16 FIELD QUALITY CONTROL

A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.

1. Perform field in place density tests according to ASTM D 6938, (nuclear method) provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D 6938.

a. When field in place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.

2. Footing Subgrade: The Geotechnical Engineer shall observe all subgrades and determine suitability to support design loads.

3. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in place density test for every 2,500 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.

4. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.

5. BMP Embankment: Testing shall be performed according to the Charlotte-Mecklenburg BMP Design Manual Section 4.0.6 dated September 1, 2024.

B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace material to depth directed by the Engineer; reshape and recompact at optimum moisture content to the required density.

C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

D. Costs associated with restoration or replacement of backfill which has not been protected shall be borne by the CONTRACTOR.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and topsoil and dispose of on-site at locations indicated. Waste material, including unsatisfactory soil, trash, and debris, shall be legally disposed of off the Owner’s property. Contractor is responsible for all costs associated with disposal and for all erosion and sediment control measures at off-site disposal areas.

END OF SECTION 31 20 00

SECTION 31 25 00 – EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE

A. Compliance: This WORK shall be performed in accordance with the erosion and sediment control plan of the Construction Drawings and the details provided therein, and as described, detailed and required by the North Carolina Department of Environmental Quality in the most recent edition of the North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual; and in the latest edition of the Mecklenburg County Land Development Standard Drawings.

B. Details: In the event a detailed plan is not shown, CONTRACTOR shall comply with the requirements of the local authority and provide a plan if required by that authority.

1.3 REFERENCES

A. North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual, latest edition.

1.4 SUBMITTALS

A. Temporary Seed Mixture: Provide written notification as to the temporary seed mixture to be used.

B. Temporary Riser: Provide shop drawings for all risers shown on the approved plans, including trash racks, and anti-flotation blocks.

C. Temporary Skimmer Device: Provide shop drawings for temporary skimmers as indicated on the approved plans.

1.5 MAINTENANCE

A. Maintain all erosion and sediment control structures to be utilized during the life of the Project in compliance with the regulations of the Division of Soil and Water Conservation until vegetative cover is acceptable to the Division’s field personnel and approval acceptance is received.

PART 2 - PRODUCTS

2.1 TEMPORARY SEEDING

A. A suitable mixture shall be selected from those listed in North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual.

PART 3 - EXECUTION

3.1 EROSION AND SEDIMENT CONTROL MEASURES

A. Measures: Silt fence, construction entrance, check dams, inlet protection, diversion ditches, skimmer basin, sediment basin, temporary vegetation, and all other items for erosion and sediment control shall be constructed as directed by the ENGINEER or in the locations shown or designated on the Drawings in accordance with the details provided.

B. Schedule: CONTRACTOR shall institute the erosion and sediment control program as a part of clearing and grubbing, and prior to rough grading. The initial program shall include, however is not limited to, the installation of silt fences, diversion ditches and/or gravel weirs as shown on erosion and sediment control drawing at the limits of clearing and grubbing where silt-carrying surface water runoff may be diverted and/or filtered prior to leaving the disturbed area.

C. Temporary Seeding: Establish temporary cover for erosion control by seeding and/or mulching graded areas which may otherwise be exposed for a period greater than 30 days. This should be accomplished as soon as rough grading WORK is done. Begin temporary seeding within 72 hours after earth disturbance.

D. Pipe Outfalls: All pipe outfall areas disturbed by construction shall be protected with non-erodible materials conforming to the North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual.

E. Maintenance: All siltation and erosion control devices installed during the course of construction shall be maintained in proper working order at all times, and shall not be removed until final stabilization of all disturbed areas or at the direction of the ENGINEER.

3.2 CLEANING OF ROADS AND STREETS

A. CONTRACTOR shall maintain a vehicle wash rack or gravel bed at all vehicle egress areas. All vehicles shall be thoroughly cleaned of mud and silt before leaving the construction site to avoid tracking mud and silt onto roads, streets, and highways. In the event that tracking does occur, CONTRACTOR shall immediately clean the street or road of all debris, mud or silt and shall pay all damages resulting therefrom. A daily survey of the condition of the adjacent streets and roads shall be made and recorded in the field log along with daily cleanup of the streets of the tracking from the site onto roads, alleys, parking lots, and highways.

3.3 PROTECTION OF STORMWATER SYSTEMS

A. Stormwater structures which will receive runoff from the construction shall be protected from the buildup of mud or silt as outlined by the North Carolina Department of Environmental Quality Erosion and Sediment Control Planning and Design Manual or as directed by ENGINEER.

END OF SECTION 31 25 00

SECTION 32 12 16 – 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. Section Includes:

1. Cold milling of existing hot-mix asphalt pavement.

2. Hot-mix asphalt patching.

3. Hot-mix asphalt paving.

4. Hot-mix asphalt paving overlay.

5. Asphalt surface treatments.

6. Pavement-marking paint.

7. Traffic-calming devices.

8. Imprinted asphalt.

B. Related Sections:

1. Division 02 Section "Site Demolition" for demolition, removal, and recycling of existing asphalt pavements, and for geotextiles that are not embedded within courses of asphalt paving.

2. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.

1.3 DEFINITION

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.

2. Job-Mix Designs: For each job mix proposed for the Work.

B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. Qualification Data: For qualified manufacturer and Installer.

D. Material Certificates: For each paving material, from manufacturer.

E. Material Test Reports: For each paving material.

1.5 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. Installer Qualifications: Imprinted-asphalt manufacturer's authorized installer who is trained and approved for installation of imprinted asphalt required for this Project.

C. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

D. 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 condition of subgrade and preparatory work.

c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT 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. Slurry Coat: Comply with weather limitations in ASTM D 3910.

3. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.

4. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials 55 deg F for water-based materials], and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: ASTM D 692, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D 1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a.

B. Asphalt Cement: ASTM D 3381 for viscosity-graded material.

C. Water: Potable.

D. Undersealing Asphalt: ASTM D 3141, pumping consistency.

2.3 AUXILIARY MATERIALS

A. Herbicide: Commercial chemical for weed control, registered by the EPA. Provide in granular, liquid, or wettable powder form.

B. Sand: ASTM D 1073, Grade Nos. 2 or 3.

C. Paving Geotextile: AASHTO M 288, nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

D. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.

2.4 MIXES

A. Hot-Mix Asphalt: Dense, 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proofroll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proofroll wet or saturated subgrades.

1. Completely proofroll subgrade in one direction. Limit vehicle speed to 3 mph.

2. Proofroll with a loaded 10-wheel, tandem-axle dump truck weighing between 20 to 30 tons.

3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineeer, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.

2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

D. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.

2. Protect primed substrate from damage until ready to receive paving.

D. 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.

E. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to 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 in number of lifts and thicknesses indicated.

2. Place hot-mix asphalt surface course in single lift.

3. Spread mix at 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.

F. 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. Complete a section of asphalt base course before placing asphalt surface course.

G. 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.

3.4 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. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

5. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 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 with nine-wheel rubber-tired roller 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. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm. Density: Acceptable compaction should be defined as a test section density within the range of 98% to 102% of the maximum density determined on a density control strip. In addition, no one test should be below 92% of maximum (Rice) specific gravity.

D. 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.

E. 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.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Surface Course: 1/8 inch.

2. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.7 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.

B. Allow paving to age for 30 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.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: The 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 according to ASTM D 3549.

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 according to ASTM D 979.

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 according to ASTM D 2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

a. One core sample will be taken for every 1000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.

b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

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.

3.9 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION 32 12 16

SECTION 32 13 13 – 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:

1. Driveways.

2. Roadways.

3. Parking lots.

4. Curbs and gutters.

5. Walks.

6. Pervious Concrete

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Other Action Submittals:

1. 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.

1.5 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.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. 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 C 94/C 94M 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 C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

D. Concrete Testing Service: Owner will engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

E. ACI Publications: Comply with ACI 301 unless otherwise indicated.

F. 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 detectable warnings.

1.7 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 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.

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.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn-steel wire into flat sheets.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs. Retain one of first two paragraphs below. Tie bars or hook bolts may be used for connection between new and existing paving and between paving and gutters.

D. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

E. 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.

F. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

G. Zinc Repair Material: ASTM A 780.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, gray Portland cement Type I

a. Fly Ash: ASTM C 618, Class F.

b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Normal-Weight Aggregates: ASTM C 33, Class 4M, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.

2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. 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 C 494/C 494M, Type A.

2. Retarding Admixture: ASTM C 494/C 494M, Type B.

3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.

5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.5 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber 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 C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.6 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 meet or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 3600 psi for hardscape.

2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45

3. Slump Limit: 4 inches, plus or minus 1 inch.

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: 5-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Pozzolan: 25 percent.

2. Ground Granulated Blast-Furnace Slag: 50 percent.

3. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash or pozzolan not exceeding 25 percent.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 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 C 94/C 94M. 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 proofroll subbase in one direction. Limit vehicle speed to 3 mph (5 km/h).

2. Proofroll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing between 20 to 30 tons.

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 31 20 00 "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 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 D 3963/D 3963M.

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. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.

4. 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. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch 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. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. 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.

G. 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.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. 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.

L. Cold-Weather 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.

M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated 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.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, 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 (300 mm) 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. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/4 inch.

2. Thickness: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).

3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed 1/2 inch (13 mm).

4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches (13 mm per 300 mm) of tie bar.

5. Lateral Alignment and Spacing of Dowels: 1 inch (25 mm).

6. Vertical Alignment of Dowels: 1/4 inch (6 mm).

7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches (6 mm per 300 mm) of dowel.

8. Joint Spacing: 3 inches (75 mm).

9. Contraction Joint Depth: Plus 1/4 inch (6 mm), no minus.

10. Joint Width: Plus 1/8 inch (3 mm), no minus.

3.10 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.

B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to 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. (0.72 kg/L).

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. 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 C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C 39/C 39M; test 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 Engineer, 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 Engineer 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 Engineer.

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 REPAIRS 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 Engineer.

B. Drill test cores, where directed by Engineer, 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.

6. PERVIOUS CONCRETE

A. Pervious concrete shall comply to ACI 522.1-13 and the North Carolina Department of Environmental Quality's (NCDEQ) Stormwater Design Manual. The sidewalk thickness shall be 6-inch with the top ½" above grade and flat slope. Installation requires a level surface on 6 inches of washed #57 stone over a scarified, uncompacted subgrade, ensuring compliance with (NCDEQ) Stormwater Design Manual. The sidewalk construction needs to be done after the surrounding area is well stabilized to prevent runoff from landscaped and asphalt areas, particularly due to the significant fines produced by asphalt.

B. The targeted void content of 15% to 25% is mandated for pervious concrete pavements, as per ASTM C 1688, with a tolerance of +/-5%. The mix submittal must include documentation of density in relation to void content, adhering to several ASTM standards that govern void content, density, infiltration rates, and resistance to degradation.

C. The mix submittal must document density relative to void content to ensure compliance, and several ASTM standards, including ASTM C1688, C1701, C1754, and C1747, govern the void content, density, infiltration rates, and resistance to degradation.

END OF SECTION 32 13 13

SECTION 32 92 00 – LAWNS & GRASSES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUMMARY

A. Section Includes:

1. Seeding.
2. Hydroseeding.
3. Sodding.

B. Related Sections:

1. Division 31 Section "Earth Moving" for topsoil stripping and stockpiling, excavation, filling and backfilling, and rough grading.
2. Division 32 Section "Exterior Plants" for border edgings.

1.3. DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

B. Finish Grade: Elevation of finished surface of planting soil.

C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4. SUBMITTALS

A. Product Data: For each type of product indicated.

1. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to this Project.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

C. Qualification Data: For qualified landscape Installer.

D. Product Certificates: For soil amendments and fertilizers, from manufacturer.

E. Material Test Reports: For existing in-place surface soil and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf during a calendar year. Submit before expiration of required initial maintenance periods.

1.5. QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in turf installation in addition to requirements in Division 1 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's [field supervisor] shall have certification in all of the following categories from the Professional Landcare Network:

a. Certified Landscape Technician - Exterior, with installation, maintenance, and irrigation specialty area(s), designated CLT-Exterior.
b. Certified Turfgrass Professional, designated CTP.
c. Certified Turfgrass Professional of Cool Season Lawns, designated CTP-CSL.

5. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
6. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for turf growth.

a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. Preinstallation Conference: Conduct conference at Project site.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7. PROJECT CONDITIONS

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of final acceptance.

1. Spring Planting: March 1 thru June 1
2. Fall Planting: September 1 thru December 1.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8. MAINTENANCE SERVICE

A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:

1. Seeded Turf: 60 days from date of planting completion.

a. When initial maintenance period has not elapsed before end of planting season, or if turf is not fully established, continue maintenance during next planting season.

2. Sodded Turf: 60 days from date of planting completion.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1. SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species: State-certified seed of grass species as follows:

C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

D. Grass Seed Mix: Fescue Rebel II or approved equal.

2.2. TURFGRASS SOD

A. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Bermudagrass (Cynodon dactylon) – Variety Tiff Tuff™ for use in select areas as identified on plans. Fescue sod shall be used in all other areas – see plans for more information.

C. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

2.3. INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Provide lime in form of ground dolomitic limestone.

B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4. ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5. FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6. PLANTING SOILS

A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Supplement with imported planting soil when quantities are insufficient.
2. Mix existing, native surface topsoil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

    1. Ratio of Loose Compost to Topsoil by Volume: 1:3
    2. Ratio of Loose Wood Derivatives to Topsoil by Volume: 1:8.
    3. Weight of Lime per 1000 Sq. Ft.: Based on soil test results.
    4. Weight of Sulfur, Iron Sulfate, Aluminum Sulfate per 1000 Sq. Ft.: Based on soil test results.
    5. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Based on soil test results
    6. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Based on soil test results.
    7. Weight of Bonemeal per 1000 Sq. Ft.: Based on soil test results
    8. Weight of Superphosphate per 1000 Sq. Ft.: Based on soil test results
    9. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Based on soil test results
    10. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Based on soil test results

2.7. MULCHES

A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

C. 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.

D. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.

E. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.8. PESTICIDES

A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.9. EROSION-CONTROL MATERIALS

D. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2. PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3. TURF AREA PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.

2. Spread planting soil to a depth of 6 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately 1/2 the thickness of planting soil over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of planting soil.
b. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:

1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
2. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.

a. Apply fertilizer directly to surface soil before loosening.

3. Remove stones larger than 1 inch in any dimension and sticks, roots, trash, and other extraneous matter.
4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4. PREPARATION FOR EROSION-CONTROL MATERIALS

A. Prepare area as specified in "Turf Area Preparation" Article.

B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.

C. Fill cells of erosion-control mat with planting soil and compact before planting.

D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.

E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.5. SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.

1. Do not use wet seed or seed that is moldy or otherwise damaged.
2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 3 to 4 lb/1000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 4:1 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

F. Protect seeded areas with slopes not exceeding 4:1 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at a rate of 10 to 13 gal./1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.

G. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch and/or planting soil within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 1/2 inch and roll surface smooth.

3.6. HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with fiber-mulch manufacturer's recommended tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than 1500-lb/acre dry weight, and seed component is deposited at not less than the specified seed-sowing rate.

3.7. SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

1. Lay sod across angle of slopes exceeding 1:3.
2. Anchor sod on slopes exceeding 1:6 with wood pegs [or steel staples] spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.8. TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.

1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

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 1/3 of grass height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

D. Turf Postfertilization: Apply fertilizer after initial mowing and when grass is dry.

1. Use fertilizer that will provide actual nitrogen of at least 1 lb/1000 sq. ft. to turf area.

3.9. SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Architect:

1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 95 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
3. Satisfactory Plugged Turf: At end of maintenance period, the required number of plugs has been established as well-rooted, viable patches of grass, and areas between plugs are free of weeds and other undesirable vegetation.
4. Satisfactory Sprigged Turf: At end of maintenance period, the required number of sprigs has been established as well-rooted, viable plants, and areas between sprigs are free of weeds and other undesirable vegetation.

B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.10. PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.11. CLEANUP AND PROTECTION

C. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

D. 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.

E. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 32 92 00

SECTION 32 93 00 – EXTERIOR PLANTS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2. SUMMARY

B. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.
4. Landscape edgings.

C. Related Sections:

1. Division 02 Section "Site Demolition" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
2. Division 02 Section "Tree Protection and Trimming" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
3. Division 31 Section "Earthwork" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
4. Division 32 Section "Lawns and Grasses" for turf (lawn), and hydroseeding.

1.3. DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

C. 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.

D. 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 minimum root spread according to ANSI Z60.1 for type and size of plant required.

E. 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.

F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

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. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

L. Planting Area: Areas to be planted.

M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

N. 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.

O. 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.

P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

Q. 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.

R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4. SUBMITTALS

A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.

B. Samples for Verification: For each of the following:

1. Organic Compost Mulch: 1-quart (1-liter) 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. Mineral Mulch: 2 lb (1.0 kg) of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on the site; provide an accurate indication of color, texture, and makeup of the material.
3. Weed Control Barrier: 12 by 12 inches.
4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

C. Qualification Data: For qualified 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.

D. 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.

E. Material Test Reports: For existing in-place surface soil, and imported or manufactured topsoil.

F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.

G. Warranty: Sample of special warranty.

1.5. 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 Division 1 Section "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in all of the following categories from the Professional Landcare Network:

    a. Certified Landscape Technician - Exterior, with installation, maintenance, and irrigation specialty area(s), designated CLT-Exterior.

5. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.

1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
3. Report suitability of tested soil for plant growth.

    a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
    b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

D. 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 will be made by Architect, who will tag plants at their place of growth before they are prepared for transplanting.

E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

F. 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 retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials seven days in advance of delivery to site.

G. Preinstallation Conference: Conduct conference at Project site.

1.6. DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, and soil amendments with appropriate certificates.

C. Deliver bare-root stock plants freshly dug. 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.

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. 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 dry condition in water for two hours. Reject dried-out plants.
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.

1.7. PROJECT 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. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of each service or utility.
2. Do not proceed with interruption of services or utilities without Owner's written permission.

C. Planting Restrictions: Plant during the periods required by the local municipality. In the event the local municipality does not specify a period, install plan material per one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: March 1st to June 15th.
2. Fall Planting: September 1st to December 1st.

D. 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.

E. 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.

1.8. 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, or incidents that are beyond Contractor's control.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization, and edgings
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods from Date of Final Acceptance

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
c. Annuals: Two months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant will be 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.

1.9. MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 12 months from date of final acceptance

B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: Six months from date of final acceptance.

C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is

concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1. PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown 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 will be rejected.
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 shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label at least one 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 as shown on Drawings.

E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Annuals and Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

2.2. INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Aluminum Sulfate: Commercial grade, unadulterated.

E. Perlite: Horticultural perlite, soil amendment grade.

F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 sieve.

G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.

H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.3. ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 3/4-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

1. Organic Matter Content: 50 to 60 percent of dry weight.
2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or granular texture, with a pH range of 3.4 to 4.8.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.

D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.

E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.4. FERTILIZERS

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

E. 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. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

F. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.5. PLANTING SOILS

A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:

1. Ratio of Loose Compost to Topsoil by Volume: 1:3
2. Ratio of Loose Wood Derivatives to Topsoil by Volume: 1:8.
3. Weight of Lime per 1000 Sq. Ft.: Based on soil test results.
4. Weight of Sulfur, Iron Sulfate, Aluminum Sulfate per 1000 Sq. Ft.: Based on soil test results.
5. Weight of Agricultural Gypsum per 1000 Sq. Ft.: Based on soil test results

6. Volume of Sand Plus 10 Percent Diatomaceous Earth per 1000 Sq. Ft.: Based on soil test results.
7. Weight of Bonemeal per 1000 Sq. Ft.: Based on soil test results
8. Weight of Superphosphate per 1000 Sq. Ft.: Based on soil test results
9. Weight of Commercial Fertilizer per 1000 Sq. Ft.: Based on soil test results
10. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.: Based on soil test results

2.6. MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Double hammered hardwood mulch.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

B. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of following type, size range, and color:

1. Type: Rounded riverbed gravel or smooth-faced stone
2. Size Range: 4” maximum.
3. Color: Readily available natural gravel color range.

2.7. WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.

B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd.

2.8. PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.9. TREE STABILIZATION MATERIALS

A. Stakes and Guys:

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 turnbuckles.
4. Guys and Tie Wires: ASTM A 641/A 641M, 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 turnbuckles 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. Proprietary Staking-and-Guying Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.

    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

        1) Arborbrace; ArborBrace Tree Guying System.
        2) Decorations for Generations, Inc.; Reddy Stake System.
        3) Other as approved by Landscape Architect

B. Root-Ball Stabilization Materials:

1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated; stakes pointed at one end.
2. Wood Screws: ASME B18.6.1.
3. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball; sized per manufacturer's written recommendations unless otherwise indicated.

2.10. LANDSCAPE EDGINGS

A. 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.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Border Concepts, Inc.
    b. Collier Metal Specialties, Inc.
    c. Russell, J. D. Company (The).
    d. Sure-Loc Edging Corporation.
    e. Other as approved by Landscape Architect

2. Edging Size: 1/8 inch wide by 6 inches deep.
3. Stakes: Tapered steel, a minimum of 12 inches long.
4. Accessories: Standard tapered ends, corners, and splicers.
5. Finish: Standard paint
6. Paint Color: Black or Brown.

2.11. MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA C2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.

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. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.

E. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

F. Mycorrhizal Fungi: Dry, granular inoculant containing at least 5300 spores per lb (0.45 kg) of vesicular-arbuscular mycorrhizal fungi and 95 million spores per lb (0.45 kg) of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

PART 3 - EXECUTION

3.1. EXAMINATION

A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2. PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities 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.

E. 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.

F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3. PLANTING AREA ESTABLISHMENT

A. Loosen subgrade of planting areas to a minimum depth of 12 inches Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

1. Apply fertilizer directly to subgrade before loosening.
2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    b. Mix lime with dry soil before mixing fertilizer.

3. Spread planting soil to a depth of 12 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

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.

3.4. EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. 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.

1. Excavate approximately three times as wide as ball diameter for balled and burlapped and container-grown stock.
2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
6. Maintain supervision of excavations during working hours.
7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Subsoil and topsoil removed from excavations may be used as planting soil.

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. Before 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. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 to 2 inches adjacent finish grades.

1. Use planting soil for backfill.
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 in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Set container-grown stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.

1. Use planting soil for backfill.
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 in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. 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 the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

C. Cut exposed roots cleanly during transplanting operations.

D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.

E. Plant trees as shown on Drawings, 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. Install trunk stabilization as follows unless otherwise indicated:

B. Staking and Guying: Stake and guy trees per Marvin Development Ordinance (MDO)

3.9. PLANTING IN PLANTERS

A. Place a layer of drainage gravel at least 6 inches thick in bottom of planter. Cover bottom with filter fabric and wrap filter fabric 12 inches up on all sides. Duct tape along the entire top edge of the filter fabric, to secure the filter fabric against the sides during the soil-filling process.

B. Fill planter with planting soil. Place soil in lightly compacted layers to an elevation of 2-inches below top of planter, allowing natural settlement.

3.10. GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines spaced as shown on the drawings and in even rows with triangular spacing.

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 will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.11. PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 4” average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 4-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 2 inches of trunks or stems.
3. Mineral Mulch in Planting Areas: Apply 3-inch average thickness of mineral mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.12. EDGING INSTALLATION

A. Steel Edging: Install steel edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced per manufacturers instructions, driven below top elevation of edging.

B. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch-deep, shovel-cut edge.

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. Spray or treat as required to keep trees and shrubs free of insects and disease.

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 past management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.14. PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents in accordance with 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 Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.15. CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. 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.

C. After installation and before [Substantial Completion] <Insert time>, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.16. DISPOSAL

A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 32 93 00

SECTION 33 05 00 – EARTHWORK FOR UTILITIES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

A. The CONTRACTOR shall furnish all labor and equipment for excavation, installation, backfill, and testing of all utility lines and appurtenances as shown on the Drawings and specified herein. This section specifies excavation and backfill for all underground utilities.

1.3. REFERENCE SECTIONS

A. Section 02 41 19 – Site Demolition

B. Section 31 20 00 – Earth Moving

1.4. REFERENCES

A. American Society of Testing and Materials (ASTM)

B. NCDOT Standard Specifications for Roads and Structures

C. Occupational Safety and Health Administration Regulations (OSHA)

1.5. SUBMITTALS

A. Submit Excavation support system design and details sealed by a professional engineer licensed in the State of North Carolina for trench excavation.

1.6. COORDINATION

A. The CONTRACTOR shall be responsible for coordinating all excavations with the Village of Marvin.

1.7. QUALITY ASSURANCE

A. Standards: Testing of backfill material shall comply with the following standards.

1. ASTM D6938 Standard Test Methods for In-Place Density and Water Content of Soil

and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

B. Excavation support system design and details for trench excavation, shall be sealed and signed by a professional engineer licensed in the State of North Carolina, copy of design shall be filed with ENGINEER.

PART 2 - PRODUCTS

2.1. BACKFILL AND PIPE BEDDINGS MATERIALS:

A. All new pipe installed shall use crushed aggregate or sand to meet the requirements of NCDOT Roadway Standard Drawings or as shown on the drawings, for pipe bedding.

B. Utilities installed in paved area shall use backfill to meet the requirements of NCDOT Roadway Standard Drawings or as shown on the drawings,

C. All other utilities installed shall be backfilled in accordance with Section 31 20 00.

PART 3 - EXECUTION

3.1. EXCAVATION

A. General: All excavation shall be performed in accordance with the current OSHA guidelines and all other regulatory authorities having jurisdiction. Provide adequate equipment to comply with OSHA regulations. All excavation shall be open-cut type except where otherwise shown on the Drawings. The slope of the sides of the excavation shall be kept as nearly vertical as possible consistent with the types of materials encountered. A clear area shall be maintained a sufficient distance back from the top edge of the excavation to avoid overloading which may cause slides, cave-ins or shifting of the pipe. All damage to pipes or structures occurring through settlements, heaving, water or earth pressures, slides, cave-ins or other causes shall be repaired by CONTRACTOR at its expense. CONTRACTOR has the option of shoring, including sheet piling, which shall be installed during excavation where required for the protection of workmen, banks, roadways and adjacent paving, structures, and utilities or as directed by ENGINEER.

B. Excavation Classification: Excavation will be classified as Common Excavation or Rock Excavation in accordance with the following definitions or will be designated as classified.

C. Common Excavation shall be defined as the excavation of all materials that can be excavated, transported and unloaded by the use of heavy ripping equipment and wheel tractor-scrapers with pusher tractors or that can be excavated and dumped in place or loaded onto hauling equipment by means of excavators having a rated capacity of one cubic yard and equipped with attachments (such as shovel, bucket, backhoe, dragline or clam shell) appropriate to the character of the materials, and the site conditions. Common Earth Excavation includes removal

and disposal of pavements and other obstructions visible to ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation.

D. Rock Excavation shall be defined as any material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material exceeding 1 cu. yd. that cannot be removed by rock excavating equipment equivalent to late-model, track mounted hydraulic excavator; equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force not less than 25,000 lbf and stick-crowd force of not less than 18,700 lbf; measured according to SAE J-1179, without systematic drilling, ram hammering or ripping (blasting not permitted).

E. Protection: Protect existing structures, utilities, sidewalks, pavements, and other facilities in areas of work. Barricade open excavations and provide warning lights. Maintain service to/from existing homes, businesses, and facilities.

F. Shoring or Sheeting: Shoring or sheeting shall be removed as the WORK progresses, unless left in place by written order of ENGINEER. Sheeting or shoring to remain after completion of the project shall be cut a minimum of 1’ below finished grade.

G. Trench Excavation: CONTRACTOR shall comply with all local, state and federal guidelines when excavating trenches. The width of the trench at and below the top of the pipe shall not exceed the outside diameter of the pipe plus 24 inches, except the minimum trench width shall be 36 inches in all cases. The width of the trench above the top of the pipe may be as wide as necessary for sheeting and bracing and the proper performance of the WORK.

H. Sidewalls: The sidewalls of pipe trenches shall be as nearly vertical as practicable to a point above the top of the pipe.

I. Over-excavation: Trenches shall be excavated to the design grade of the pipe to provide uniform bearing and support along the entire length of pipe. Care shall be taken not to over excavate. Over excavation of otherwise suitable material shall be replaced with suitable material as directed by ENGINEER. The cost of such fill shall be borne by CONTRACTOR.

J. Unsuitable Material/Rock: When material is found to be of poor supporting value or of rock and when the ENGINEER cannot adjust in the location of the pipe, undercut existing foundation material within the limits established in the plans. Backfill the undercut with foundation conditioning material. Encapsulate the foundation conditioning material with foundation conditioning geotextile before placing bedding material. Overlap all transverse and longitudinal joints in the geotextile at least 18 inches.

K. Disposal: All excavated material being disposed of off site shall be done legally.

3.2. SEPARATION OF WATERLINES AND SANITARY SEWERS

A. Waterlines shall be laid at least ten feet horizontally from sewer lines and sewer manholes whenever possible; the distance shall be measured edge-to-edge.

1. When local conditions prevent a horizontal separation of ten feet, the waterline may be laid closer to a sewer main or sewer manhole provided that: (1) the bottom of the

waterline is at least 18 inches above the top of the sewer; or (2) the water main shall be laid in the same trench as the sewer, with the water main located at one side on a bench of undisturbed earth and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.

B. Crossing: Waterline crossing over sewer line shall be laid to provide a separation of at least 18 inches between the bottom of the waterline and the top of the sewer whenever possible. The length of waterline shall be centered at the point of the crossing so that joints shall be equidistant from the sewer.

1. When local conditions prevent a vertical separation described above, the following construction shall be used: (1) sewers passing over or under waterlines shall be constructed of AWWA approved water pipe, pressure tested in place to 30 psi without leakage prior to back-filling; (2) waterlines passing under sewers shall, in addition, be protected by providing:

a. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the waterline.

b. Adequate structural support for the sewer to prevent deflection of joints.

C. Sewer Manholes: If a waterline passes within 10 feet of a sewer manhole, the sewer manhole shall be tested and made watertight.

D. Sewers and Sewer Manholes: No water pipes shall pass through or come in contact with any part of a sewer manhole.

3.3. BACKFILLING

A. Operation: CONTRACTOR shall keep trenches backfilled on a daily basis. Prior to the end of the working day, each trench will be completely backfilled. All backfill shall be brought up equally along each side of the pipe in such manner as to avoid displacement of or damage to the pipe.

B. Material: Shall conform to PART 2 – PRODUCTS above.

C. No fill shall be placed until the subgrade has been checked and approved by the Geotechnical Engineer, and in no case shall fill be placed on a subgrade that is muddy, frozen, or that contains frost.

D. Disposal of Unsatisfactory Material: When, in the opinion of ENGINEER, the excavated material is not satisfactory for use as backfill, the material shall be disposed of offsite legally. Select material shall be brought in by CONTRACTOR.

E. Compaction:

1. Washed sand bedding material shall be brought up in layers not exceeding 3 inches in compacted depth for the full length of pipe. Each layer shall be thoroughly compacted by mechanical tampers or hammers. Bedding material, and compaction shall comply with pipe manufactures specifications.

2. Backfill materials shall be placed and compacted in accordance with the requirements of Section 31 20 00, “Earth Moving”.

3. Asphalt pavement subbase and concrete shall be placed in accordance with Section 32 12 16, “Asphalt Paving” and Section 32 13 13 “Concrete Paving”.

F. Testing: The backfill shall be tested to insure that the required density is being achieved. OWNER is responsible for costs associated with testing. ENGINEER shall select the depth at which the test is to be taken. Backfill not compacted to the required density shall be removed, recompacted, and retested at CONTRACTOR'S expense until the requirements are met.

G. Excess Disposal: Excess material shall be disposed of on site or off site legally at the discretion of the OWNER.

H. Settlement: All backfilled areas where settlement occurs shall be filled and maintained during the life of the Project and for a period of 1 year following the date of final acceptance of all WORK.

I. Hazards: When the CONTRACTOR is notified by ENGINEER or OWNER that all backfill presents a hazard, CONTRACTOR shall correct such hazardous condition at once.

3.4. BORROW

A. Availability: Where satisfactory materials are not available in sufficient quantity from required excavations, suitable materials shall be obtained from approved off-site borrow areas.

B. Placement: Borrow material shall be placed and compacted only when approved by ENGINEER and a Licensed Geotechnical Engineer.

C. Payment: No separate payment will be made for furnishing and placing approved borrow material. Compensation in full is included in the agreed to price paid for this Project.

3.5. BLASTING

A. Not Applicable.

END OF SECTION 33 05 00

SECTION 33 05 26 – UTILITY LOCATION AND IDENTIFICATION

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions, Supplemental General Conditions, and Division 01 Specification sections, apply to work of this section.

1.2. SUMMARY

A. The purpose of this Section is to specify the requirements for utility location tape and buried detection wire. In general, all utility pipelines shall be marked by appropriately marked metallic tape 12 to 24 inches above the conduct. Buried detection wire shall be buried just above conduit.

1.3. REFERENCES

A. North Carolina General Statutes

1.4. SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

1.5. SEQUENCING

A. The tape or wire shall be installed at the same time as the pipeline.

PART 2 - PRODUCT

2.1. WARNING AND IDENTIFICATION TAPE

A. Polyethylene plastic and metallic core or metallic-faced, acid-and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3-inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, “CAUTION, BURIED (intended service) LINE BELOW” or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes

Red:	Electric
Yellow:	Gas, Oil, Steam
Blue:	Water

Green:	Sewer
Purple:	Storm
Orange:	Communications

B. Warning Tape for Metallic Piping: Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi otherwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

C. Detectable Warning Tape for Non-Metallic Piping: Polyethylene plastic tape conforming to the width, color and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inches. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection. Color coded tape shall be installed flat with colored side up to 12 inches to 24 inches over all installed utility lines including main line and service lateral or service connection.

2.2. BURIED DETECTION WIRE

A. Detection wire shall be insulated by single strand, solid copper with a minimum of 12 AWG for a buried depth of less than 4 feet and 4 AWG for a buried depth greater than or equal to 4 feet. Detection wire shall be buried directly above piping at a distance not to exceed twelve (12) inches above the top of pipe. The wire shall extend continuously and unbroken, from point of access to point of access. The ends of the wire shall terminate with a minimum of three (3) feet of wire, coiled, remaining accessible in each tank, manhole, structure, and fire. The wire shall be exposed at the connection between contact A & b until the connection can be made to the wire by the last contractor to make the pipe connection.

END OF SECTION 33 05 26

SECTION 33 41 00 – STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Work under this section shall consist of providing all labor, plant facilities, materials, tools, equipment, shop drawings and supervision necessary and required to install all of the storm drainage facilities, including piping, fittings, structures, bedding, and backfilling, as specified in accordance with the contract documents.

1.3 REFERENCE SECTIONS

A. Section 33 05 00 – Earthwork for Utilities

1.4 REFERENCE STANDARDS

A. American Society For Testing and Materials (ASTM)

1. A185 – Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
2. A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
3. C76 – Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
4. C478 – Precast Reinforced Concrete Manhole Sections
5. C913 – Precast Concrete Water and Wastewater Structures
6. C1479 – Installation of Reinforced Concrete Pipe
7. C990-01A – Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Pre-formed Flexible Joint Sealants
8. D2321 – Installation of Thermoplastic Pipe for Sewer/Gravity-Flow Applications
9. D3034 – Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
10. D3212 – Joints for Drain and Sewer Plastic Pipes Using Elastomeric Seals
11. F477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe
12. F794 – Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

13. F949 – Poly(Vinyl Chloride) (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

B. American Association of State Highway and Transportation Officials (AASHTO)

1. M198 – Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets

2. M252 – Corrugated Polyethylene Drainage Tubing

3. M294 – Corrugated Polyethylene Pipe.

4. M199 – Standard Specification for Precast Reinforced Concrete Manhole Sections

C. American Water Works Association (AWWA)

1. C110 – Ductile-Iron and Gray-Iron Fittings, 3 in through 48 in (75 mm through 1200 mm), for Water and Other Liquids (revision of ANSI/AWWA C110/A21.10-93)

2. C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

3. C151 – Ductile-Iron Pipe, Centrifugally Cast, for Water

D. American Concrete Institute (ACI)

1. 301 – Structural Concrete for Buildings, Specifications for

2. 318 –Building Code Requirements for Structural Plain Concrete

1.5 PROJECT RECORD DOCUMENTS

A. Accurately record as-built locations of pipe runs, connections, catch basins, cleanouts, top and invert elevations.

B. Identify and describe unexpected variations of subsurface conditions and location of any utilities encountered.

1.6 QUALITY ASSURANCE

A. All costs related to reinspection due to failures shall be paid for by the Contractor at no additional expense to the Owner. The owner reserves the right to direct any inspection that is deemed necessary. Contractor shall provide free access to site for inspection activities.

1.7 PROJECT CONDITIONS

A. Removal/Relocation of Existing Utilities: The contractor shall be responsible for removal and/or relocation of existing utilities, whether shown or not shown on the drawings, at locations where conflicts occur with proposed storm drainage improvements at no additional cost to the owner.

1.8 SUBMITTALS

A. The General Contractor and the Subcontractor shall execute the Conformance Submittal(s) at the end of this section.

B. Product Data: Submit manufacturer's technical product data and installation instructions for storm drainage piping and products, in accordance with requirements of Division 1.

C. Record drawings: At project closeout, submit record drawings of installed storm drainage piping and products, in accordance with requirements of Division 1.

D. The contractor is required to provide as-builts of the above ground sand filter and below ground cistern for the Engineer’s review and certification

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. Reinforced Concrete Pipe (RCP)

1. ASTM C76, Class III unless otherwise noted on drawings; and,

2. Butyl mastic sealant shall meet the requirements of ASTM C990-01a or AASHTO M198 for Type B flexible plastic gaskets.

B. Polyvinyl Chloride Pipe (PVC)

1. Pipe shall meet the requirements of ASTM D1784, and 1785 for Schedule 40 pipe; and,

2. PVC pipe shall be joined by solvent weld joint type connections. The pipe joints shall be tightly sealed against infiltration and exfiltration.

3. Maximum allowable diameter shall be 12 inches.

C. High Density Polyethylene Pipe (HDPE) Smooth Interior

1. Pipe and fittings shall conform to AASHTO M252 and M294;

2. Rubber gaskets shall meet the requirements of ASTM F477 with joints conforming to ASTM D3212; and,

3. Maximum permitted diameter of 24 inches and only where indicated on drawings; and,

D. Subdrains

1. Subdrains shall be installed along all foundation walls, retaining walls, seat walls, and as indicated in the contract documents.

2. Shall be perforated PVC Schedule 40 or HDPE; and,

3. PVC pipe shall be limited to pipe diameters less than 12-inches; and,

4. PVC pipe shall be joined by solvent weld joint type connections. The pipe joints shall be tightly sealed against infiltration and exfiltration.

5. All subdrains shall be installed with a sock filter to prevent the migration of fines into the pipe.

2.2 DRAINAGE STRUCTURES, DROP INLETS, CATCH BASINS, MANHOLES, JUNCTION BOXES, AND YARD INLETS (ALL STRUCTURES SHALL BE PRECAST UNLESS OTHERWISE APPROVED BY THE OWNER)

A. Structures:

1. Precast Concrete Drainage Structures;

2. Heavy-duty traffic rated (HS-20) conforming to ASTM C478, ASTM C913 and ASTM C890.

3. Walls and bottom slab shall be 6 inches thick for structures 8 feet in height or less. For structures between 8 feet and 16 feet in height, walls and bottom slab shall be 8 inches thick.

B. Steps

1. Shall meet the requirements of NCDOT 840.66 for design, materials, and dimensions;

2. Built into the walls of all structures over 3.5 feet in height; and,

3. Steps shall be 12 inches on center with lowest step being no more than 16 inches from the bottom.

C. Reinforcement

1. Reinforcement shall be provided as needed to obtain HS-20 traffic rating as noted above.

D. All joints in precast structures shall be patched inside and out with non-shrink grout.

2.3 CLEANOUTS & PLUGS

A. Installation shall be in accordance with the details and at locations shown on the drawings.

B. All Cleanouts shall have a concrete apron.

2.4 BEDDING AND BACKFILL MATERIAL

A. Bedding and backfill shall meet the requirements of NCDOT 300.01 or as directed by the Owner’s geotechnical engineer.

2.5 CONCRETE

A. No concrete or masonry shall be placed when the temperature is below 40 degrees Fahrenheit, or when indications are for lower temperatures within 24 hours, unless protection of concrete and masonry is approved by the Owner. Damage to the structure because of freezing shall be corrected by the Contractor at his own expense, to the satisfaction of the Owner.

B. Concrete shall conform to ACI 301 and applicable referenced specifications and shall have a 28 day compressive strength of 3,600 psi.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall install all drainage structures and pipe in the locations shown on the drawings and/or as approved by the Owner. Pipe shall be of the type and sizes specified on the drawings and shall be laid accurately to line and grade. Structures shall be accurately located and properly oriented.

B. Excavation and Backfill – The provisions in Section 33 05 00, Earthwork for Utilities shall govern all work under this Section.

C. Storage and Handling of Pipe – All pipe shall be protected against impact, shock and free fall, and only equipment of sufficient capacity and proper design shall be used in the handling of the pipe. Storage of pipe on the job shall be in accordance with the pipe manufacturer's recommendations.

D. Damage to Pipe

1. Pipe which is defective from any cause, including damage caused by handling, and determined by the Owner as unrepairable, shall be unacceptable for installation and shall be replaced at no cost to the Owner and as directed by the Owner; and,

2. Pipe that is damaged or disturbed through any cause prior to acceptance of the work, shall be repaired realigned or replaced as directed by the Owner, at the Contractor's expense.

E. Manholes, catch basins and drain inlets shall be constructed as soon as the pipe laying reaches the location of the structures. Should the Contractor continue his pipe laying without making provisions for completion of the structures, the Owner shall have the authority to stop the pipe laying operations until the structure is completed.

F. Any structure, which is mislocated or oriented improperly, shall be removed and re-built in its proper location, alignment and orientation at the Contractor's expense.

3.2 BEDDING

A. Bedding material, when required, shall be in accordance with Section 33 05 00, Earthwork for Utilities for work described within this Section.

3.3 PIPE INSTALLATION

A. Comply with Section 33 05 00, Earthwork for Utilities

B. Laying Pipe

1. Unloading and Handling: All pipes shall be unloaded and handled with reasonable care. Pipes shall not be rolled or dragged over gravel or rock during handling. The Contractor shall take necessary precautions to ensure the method used in lifting or placing the pipe does not induce stress fatigue in the pipe and the lifting device used uniformly distributes the weight of the pipe along its axis or circumference;

2. Each length of pipe shall be inspected for defects and cracks before carefully lowered into the trench. Any damaged or any pipe that has had its grade disturbed after laying shall be removed and replaced. Bituminous coated pipe shall be handled with special care and repair of damaged coating shall conform with AASHTO M190;

3. Lay pipe on prepared foundation starting at the downgrade end according to line and grade with the necessary drainage structures, fittings, bends and appurtenances as shown on the drawings. Rigid pipes shall be laid with the bell or groove ends upgrade with the spigot or tongue fully inserted. Flexible pipes shall be laid with the inside circumferential laps pointing downstream and with the longitudinal laps at the side or quarter points. Reinforced concrete pipe shall be installed in accordance with ASTM C1479. HDPE pipes shall be installed in accordance with pipe manufacture's installation guidelines for heavy duty drainage applications and ASTM D2321; and,

4. Pipe sections shall be firmly joined together with appropriate gaskets or bands.

3.4 DROP INLET, CATCH BASIN, MANHOLE, JUNCTION BOX, AND YARD INLET INSTALLATION

A. Pre-cast Drainage Structures

1. Structure units shall be assembled in accordance with the manufacturer's instructions to form a sound structural unit. Precast elements are to conform to ASTM C478 and designed per ASTM C890 for HS-20 loading.

2. Patch joints of pre-cast pieces from inside and outside with non-shrink grout and finish smooth.

3. Waterproof from outside with bituminous coating per the manufacturer recommendations. Coal Tar Epoxy shall have a minimum dry film thickness of 16 millimeters (22 millimeters wet). Apply a minimum of two coats of bituminous coating. Each coat to be 8-10 millimeters thick (dry thickness).

4. Minimum Catch Basin size is 2'-2" x 3' inside dimensions per NCDOT detail 840.02 with frame, grate, and hood dimensions per NCDOT detail 840.03.

5. Minimum Drop Inlet size is 2'x3' inside dimensions per NCDOT detail 840.14 with grate dimensions per NCDOT detail 840.16.

6. Minimum Junction Box size is 2'-3" x 2'-3" inside dimensions per NCDOT detail

840.31.

7. Epoxy coated steps for structures over 3.5’ deep.

8. Base slab shall be shaped for inverts per NCDOT detail 840.00.

B. Fittings and Connections

1. Pipe connections shall be made so that the pipe is flush with the inside wall of the drainage structure, and shall be grouted as necessary to make smooth and uniform surfaces on the inside of the structure. Boxes to have bottoms filled with concrete to provide a bench between pipe inverts.

2. Flexible boots shall be used for all pipe connections.

C. Frames, Grates and Hoods

1. Shall be set to grade in accordance with the drawings;

2. Firmly embedded in mortar approximately 1 inch thick and aligned to fit the top section of the structure; and,

3. Bricks set in mortar used to adjust the frame to finished grade shall be limited to no more than four courses for pre-cast structures and have a minimum wall thickness of 8 inches.

4. Shall be HS-20 rated and installed with 24” minimum clear opening.

D. Interface with Existing Facilities

1. Compliance with Facility Owner Requirements: Connections made into existing drainage facilities shall be performed in accordance with the requirements of the Owner of the facility, and all pipes shall be cut flush with wall of structure. Pipe connections to existing structures shall be made through the installation of a wall sleeve and grout, and then the use of a flexible boot connector. The Contractor will be required to comply with all such requirements, including securing of all required permits, and paying the costs thereof. The cost of making the connections in accordance with the requirements of the Owner of the existing facility shall be included in the Contract Sum; and,

2. Requirements: The Contractor shall make all required connections of the proposed drainage facilities into existing drainage facilities, where and as shown on the Drawings and/or as approved by the Owner.

3.5 CONSTRUCTION WITHIN THE PUBLIC R.O.W.

A. Construction within the public right-of-way shall conform to all requirements of the regulatory authority having jurisdiction.

3.6 MODIFICATIONS OF EXISTING STRUCTURES

A. General: The Contractor shall alter, reconstruct and/or convert existing structures where and as

shown on the drawings, and/or as approved by the Owner. In general, alterations shall be performed with the same type of material used in the original construction unless otherwise indicated on the drawings or approved by the Owner.

B. Damage to Existing Installations: The Contractor shall exercise extreme care during such alteration, reconstruction and/or conversions so as not to damage any portions of the structure and/or pipe shown to remain. Any such damage shall be repaired by the Contractor at his own expense and to the satisfaction of the Owner.

3.7 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.8 PROTECTION AND CLEANING

A. The Contractor shall maintain all pipe installations and drainage structures in a condition such that they will function continuously and shall be kept clean of silt, debris and other foreign matter from the pipe and drainage structure is installed until the project is accepted.

3.9 FINAL INSPECTION

A. Upon completion of the work and before final acceptance by the Owner, the entire drainage system shall be subject to a final inspection in the presence of the Owner and/or Site Engineer. The work shall not be considered as complete until all requirements for line, grade, cleanliness, and workmanship have been completed.

B. Storm Sewer Pipe Testing: Storm sewer pipes and structures shall be visually inspected by the CONTRACTOR and testing agency of the OWNER prior to backfilling.

END OF SECTION 33 41 00