Request for Proposals

For

Environmental Consultant: Phase 1 ESA Update and HEROS Upload - The Arbors at South Crossing Seniors and Family East

For

GREENSBORO HOUSING AUTHORITY/ GREENSBORO HOUSING MANAGEMENT CORPORATION

450 North Church Street
Greensboro, NC 27401

Date of Issue
June 26, 2026

Responses Due
July 13, 2026
4:00 PM EST

1. INTRODUCTION

The Greensboro Housing Authority (GHA), through its affiliates real estate development arm, Greensboro Management Corporation (GHMC), is seeking a qualified Environmental Consultant to update and reevaluate an existing HUD Environmental Review for a proposed RAD / Section 18 Blend transaction at the following property

GHMC is seeking a qualified Environmental Consultant who has extensive experience in performing Phase 1 Environmental assessments for RAD transactions.

2. BACKGROUND & OVERVIEW

The Greensboro Housing Authority is the third largest Housing Authority in the State of North Carolina with a combined ownership of 21 properties along with the direct management of over 3,554 housing choice vouchers serving over 12,368 families in Greensboro, North Carolina. GHA owns and/or manages 2,420 residential units.

On December 23, 2013, GHA received approval from United States Department of Housing and Urban Development (HUD) for a Portfolio Award under the RAD, which includes GHA's entire public housing portfolio. To date, 20 properties have been converted into the RAD program. GHMC is in process of converting the remaining property ("Smith Homes") from its original Portfolio Award designation.

Property Information

The brief descriptions of the properties are listed below:

The Smith Homes development is located at 707 West Florida Street, Greensboro, NC 27406. The property is bounded by Freeman Mill Road to the west and Randleman Road to the east Prior to the demolition of the North Side of the community (238 units on 21.97 of 49 acres), the site contained a total of 428 public housing units and two non-residential units, plus a community building. All units remaining units are in low-rise buildings and range in size from one to five bedrooms. The first 400 units were built in 1952, with an additional 30 elderly units were added in 1964. To date, GHMC has demolished 62 residential buildings and 1 non-residential building on the North side of Smith Homes for a total of 242 units, and are currently finishing the installation of all public ROW infrastructure for the north side of the property. (See attachment A)

The property has previously received:

- A HUD Part 58 Environmental Review and clearance in 2020 (see Attachment B), and
- A "No Further Action" determination from the State of North Carolina in 2020 regarding site contamination (see Attachment B).

HUD requires this Environmental Review to be reperformed and documented in HEROS due solely to the expiration of the applicable five-year validity period, which ended in December 2025. This scope is intended to update, validate, and document changed conditions, not to redo the review from baseline.

3. SCOPE OF SERVICES

A. Prior Review Validation and Gap Analysis

The Consultant's work shall comply with, as applicable:

- 24 CFR Part 50 (HUD performed Environmental Review for public housing RAD transactions)
- National Environmental Policy Act (NEPA)
- 24 CFR §50.4 (Related Federal Laws and Authorities)
- HUD Environmental Review Requirements for RAD Conversions
- HUD Environmental Review Online System (HEROS) requirements
- HUD guidance governing environmental reevaluations and aged reviews

B. Targeted Updates to Environmental Factors

The Consultant shall only update technical analyses where triggered by changed conditions, lapse of validity, or HUD requirements. Work shall include the following as applicable:

1. Site Contamination & Hazards

- Conduct a new Phase I ESA using the previous 24 CFR Part 58 review and the existing NFA determination as the baseline condition.
- Updated database review and site reconnaissance to confirm no new RECs.

2. Historic Preservation (Section 106)

- Confirmation that prior SHPO determination remains valid.
- Updated coordination only if scope, footprint, or APE has changed.
- Preparation of a continuity or no-change determination letter, if appropriate.

3. Floodplains, Wetlands & Natural Resources

- Updated FEMA FIRM and NWI map review.
- Reconfirmation of determinations where flood map panels or boundaries have changed since 2020.

4. Noise, Hazards & Airport Clear Zones

- Updated screening to reflect current traffic volumes, rail activity, or nearby uses.
- Reliance on prior analysis where no material changes are identified.

5. **Environmental Justice**

    - Updated Environmental Justice narrative reflecting current demographic data and project conditions

C. HEROS Re-evaluation and Documentation

1. The Consultant shall:
    - Establish a new HEROS Environmental Review record (or HUD directed reevaluation entry).
    - Clearly reference the 2020 Part 58 review and NFA determination within HEROS narrative fields.
    - Upload prior approvals as supporting documentation, clearly labeled as "Prior Environmental Review – Reference".
    - Prepare concise, defensible narrative responses focused on changed conditions and confirmation of continued compliance.
    - Identify mitigation measures only where newly required.

2. HEROS Upload Checklist:

    - HEROS Project Setup (Required)

        - New HEROS Environmental Review record established (or HUD directed reevaluation workflow)
        - Correct HUD Program selected (Public Housing / RAD / Section 18 Blend)
        - Project description explicitly states:
            - Prior Part 58 review completed in 2020
            - Five-year validity expired in December 2025
            - Purpose of review is confirmation of continued compliance
            - All funding sources accurately listed

    - Prior Environmental Review – Reference Uploads (Required)
      (Upload as "Reference – Prior Environmental Review")

        - 2020 Part 58 Environmental Review Record
        - Part 58 clearance documentation / Authority to Use Grant Funds
        - Prior mitigation measures (if any)
        - Any prior HUD correspondence relevant to environmental findings

    - State Environmental Clearance – Reference Uploads (Required)

        - North Carolina DEQ No Further Action (NFA) letter
        - Supporting state documentation relied upon for NFA determination
        - Consultant narrative confirming continued applicability of NFA

    - Environmental Reevaluation Summary (Required)

- Environmental Reevaluation Summary Memorandum addressing:
    - Prior approvals
    - Confirmation of unchanged site conditions
    - Identification of any changed conditions since 2020
    - Determination that findings remain valid (or explanation of limited updates)
- Explicit statement that no new choice limiting actions have occurred since prior clearance

- Site Contamination & Hazards (Update)
    - Desktop environmental database update (post 2020)
    - Current site reconnaissance confirmation
    - Supplemental memorandum affirming no new RECs
    - Phase I ESA
    - Updated radon consideration narrative (no testing required unless otherwise indicated)

- Floodplains & Wetlands (Update Confirmation)
    - Current FEMA FIRM panel(s)
    - Floodplain determination confirmation
    - Updated National Wetlands Inventory (NWI) maps
    - 8 Step Process documentation only if new floodplain impact is identified

- Historic Preservation (Section 106) – Continuity Review
    - Prior SHPO concurrence / determination uploaded as reference
    - Consultant memorandum confirming:
        - No change to APE, footprint, or scope OR
        - Description of limited changes and updated SHPO coordination (if required)
    - Updated SHPO correspondence only if triggered

- Noise & Explosive / Flammable Hazards (Screening Update)
    - Updated traffic / rail / industrial screening
    - Confirmation that prior noise and hazard determinations remain valid
    - Updated calculations only if surrounding conditions have materially changed

- Housing, Health & Safety (Confirmation)
    - Prior LBP / asbestos findings uploaded for reference
    - Demolition and construction safety confirmation narrative
    - Updated slope / utilities / site safety screening

- Environmental Justice (Required Update)

- Updated Environmental Justice narrative
- Current demographic data or mapping relied upon
- Confirmation that project does not cause disproportionate adverse impacts

- Mitigation Measures (If Applicable)

  - Summary of previously approved mitigation measures
  - Confirmation that mitigation remains sufficient OR
  - Identification of newly required mitigation (if triggered)
  - Monitoring responsibilities clearly stated

- Final Clearance Support (Required)

  - Consultant responses to HUD Environmental Officer comments
  - Revised HEROS narratives addressing continuity and shelf life issues
  - HEROS record finalized and internally consistent
  - Review marked clearance ready for HUD approval

Any scope expansion beyond reevaluation (e.g., reopening Section 106, Phase II testing) must be:

1. Justified in writing, and Pre-authorized by the Owner, prior to execution.

D. HUD Review and Clearance Support

- Respond to HUD Environmental Officer comments related to continuity, shelf life expiration, or reevaluation sufficiency.
- Update HEROS narratives and uploads as required for clearance.
- Support final environmental approval under Part 50.

E. Deliverables

At a minimum, the Consultant shall provide:

1. Environmental Reevaluation Summary Memorandum
   - Addressing prior clearance, site history, and confirmation of continued compliance.
2. Targeted technical memoranda (where triggered)
3. Fully populated, clearance ready HEROS record
4. Final mitigation confirmation or monitoring requirements, if applicable

F. Regulatory Framework

The Consultant's work shall comply with, as applicable:

- 24 CFR Part 50 (HUD performed Environmental Review for public housing RAD transactions)

- National Environmental Policy Act (NEPA)
- 24 CFR §50.4 (Related Federal Laws and Authorities)
- HUD Environmental Review Requirements for RAD Conversions
- HUD Environmental Review Online System (HEROS) requirements
- HUD guidance governing environmental reevaluations and aged reviews

4. METHOD OF SOLICITATION & SUBMISSION REQUIREMENTS

Proposal Submission Requirements

Each response submittal package should include the following. If the response package is incomplete, your submission may be deemed non-responsive.

A. Schedule

- Estimated timeframe from authorization to final report highlighting the following:
  - Site assessment completion
  - Report delivery after completion of site assessment
  - Timing for HEROS upload

B. Relevant Experience

- Experience providing Phase 1 ESA, 24 CFR Part 50 reviews and HEROS Upload

D. Fee Proposal

- Lump sum fee for completion of services

E. Insurance Requirements

Respondents shall provide documentation evidencing compliance with GHA/GHMC's insurance requirements (as applicable) which are as follows:

a. Commercial General Liability: Shall have minimum limits of $1,000,000 per occurrence combined single limit with a $2,000,000 annual aggregate for bodily injury liability and property damage liability. This shall include premises and/or operations, independent contractors, products and/or completed operations, broad form property damage and XCU coverage, and a contractual liability endorsement.

b. Business Auto Policy: Shall have minimum limits of $1,000,000 per occurrence combined single limit for bodily injury liability and property damage liability. This shall include owned vehicles, hired and non-owned vehicles, and employee non-ownership.

c. Workers Compensation: Insurance covering all employees and owners performing work or providing services under this contract. The coverage must include employers' liability with a

limit of $100,000 each accident, $100,000 bodily injury by disease each owner/employee, and $500,000 bodily injury by disease policy limit. Where applicable, coverage shall meet any additional requirements of state and federal law.

d. Builders Risk Insurance: Insurance including coverage for a) Owner occupancy while construction is in progress and b) Equipment, machinery, fixtures, and materials not yet installed, but intended to become part of the structure.

e. Umbrella Policy: $5,000,000 Per Occurrence / $5,000,000 Annual Aggregate.

GHMC and its affiliates shall be named as additional insured on both the Comprehensive General Liability and Business Auto Liability policies. GHMC and its affiliates shall be included as named insured on the Builders Risk insurance policy. Current, valid insurance policies and bonds (if applicable) meeting the requirements identified herein shall be maintained during the entire term of this Agreement. Renewal certificates shall be sent to GHMC thirty (30) days prior to any expiration date, and Contractor's insurer(s) and bond provider (if applicable) shall give GHMC thirty (30) days prior written notification in the event of cancellation or modification by either Contractor or Contractor's insurer(s) or bond provider (if applicable) of any coverage required by this Agreement.

Contractor shall furnish GHMC with a Certificate(s) of Insurance evidencing the coverages required herein. It shall be unacceptable for any Certificate of Insurance to contain language or wording to the effect that the insurer shall have no liability for failure to provide the prior notices required therein. It shall be the responsibility of Contractor to ensure that any agreements between Contractor and subcontractors shall contain the same insurance requirements as set forth herein.

F. Team and Point of Contact

Name and contract information for project lead (also provide primary backup contact person).

Name
Title
Email address
Office and Mobile Phone Number

G. Email Submission Requirements

GHMC must receive (1) electronic copy of the complete submission package via email to Anthony Waddell at awaddell@gha-nc.org, and Kenny Parks at kparks@gha-nc.org, no later than 4:00 PM (EST), July 13, 2026.

Please note in the email subject line: Environmental Consultant: Phase 1 ESA Update and HEROS Upload - The Arbors at South Crossing Seniors and Family East.

Please include the respondent's name, address, telephone number, e-mail address in the submission

e-mail.

Email responses received later than the date and time specified may be rejected or deemed nonconforming. GHA assumes no responsibility or liability for receipt of responses.

Anticipated Schedule

RFP distributed to potential respondents	June 26, 2026
Proposals Due	July 13, 2026
Evaluation of Submissions (Completion Date)	July 17, 2026
Notification of Award	July 18, 2026
Contractual Agreement In Place/Start of Services	July 27, 2026

5. EVALUATION OF PROPOSALS

All proposals received will be reviewed and evaluated by an Evaluation Committee assigned by the Chief Executive Officer and/or its designee. Proposals will be considered in terms of the evaluation indicated in the table below.

Experience and Current Activity (Knowledge & Experience)	Experience in conducting 24 CFR Part 50 Environmental Reviews, Phase 1 Environmental Assessments and Experience with Uploading Information to the HEROS portal	50
Capacity	Ability to provide the necessary staffing to complete the assessment in a timely manner	20
Timing	Ability to quickly complete the Assessment and HEROS upload	10
Pricing	Proposed cost proposal is most competitive and provides the maximum benefit to the GHMC	20
MBE/WBE	Is the firm a MBE/WBE?	5
	Maximum Total Points	105

6. GHMC's RESERVATION OF RIGHTS

GHMC reserves the right to:

- Reject any or all responses, to waive any informalities in the solicitation process, or to terminate the solicitation process at any time, if deemed by GHMC to be in its best interest,
- Not to select or make award to anyone with a history of poor performance on projects performed for GHMC and or any other client of the submitting firm at the sole opinion and discretion of GHMC,
- Terminate a contract awarded pursuant to this solicitation at any time for its convenience upon delivery of a 30-day written notice,
- Determine the days, hours and locations that the successful bidder shall provide the items or services called for in this solicitation,
- Reject and not consider any bid that does not, in the opinion of GHMC, meet the requirements of this solicitation, including but not necessarily limited to incomplete response and/or alternate (not including "or equal" items) or non-requested items or services,
- To make an award to the same bidder (aggregate) for all items; or,
- To make multiple awards to multiple firms for various scopes of work.
- GHMC reserves the right to reject all proposals and to re-solicit new proposals should this solicitation fail to produce an acceptable agreement. GHMC may also reject any proposals that are incomplete or non-responsive and any proposals that are submitted after the deadline.
- Further, GHMC reserves the right to request additional information from any respondent after the submission deadline. GHMC also reserves the right to reject any and all, or parts of any and all, proposals received in response to this RFP or to cancel or postpone this solicitation process if GHMC determines that such rejection, cancellation or postponement is in the best

interests of GHMC, to request additional information; and to waive any irregularities in this solicitation or in the proposals received as a result of the solicitation.

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7. RESPONDENT'S RESPONSIBILITY:

It is the respondent's responsibility to:

- Carefully review and comply with all instructions provided herein or provided within any named attachments or addenda.
- Bear all expenses involved with the preparation and submission of Request for Proposals (RFPs).

ATTACHMENT A – PUBLIC ROW SITE INFRASTRUCTURE PROJECT INFORMATION

- Project Site Plan
- Project Specifications/Summary of Work
- Project Budget

NOTE:

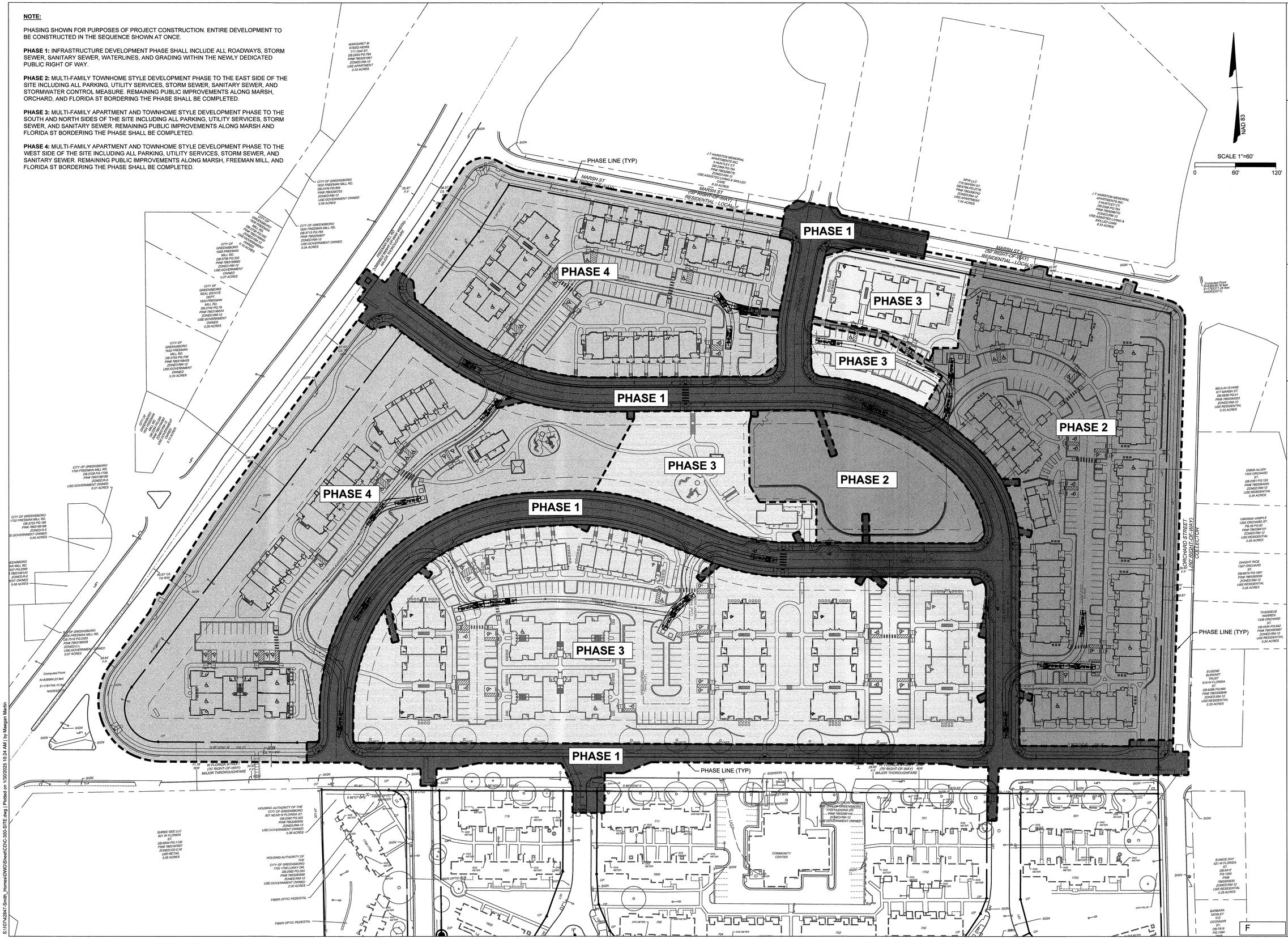
PHASING SHOWN FOR PURPOSES OF PROJECT CONSTRUCTION. ENTIRE DEVELOPMENT TO BE CONSTRUCTED IN THE SEQUENCE SHOWN AT ONCE.

PHASE 1: INFRASTRUCTURE DEVELOPMENT PHASE SHALL INCLUDE ALL ROADWAYS, STORM SEWER, SANITARY SEWER, WATERLINES, AND GRADING WITHIN THE NEWLY DEDICATED PUBLIC RIGHT OF WAY.

PHASE 2: MULTI-FAMILY TOWNHOME STYLE DEVELOPMENT PHASE TO THE EAST SIDE OF THE SITE INCLUDING ALL PARKING, UTILITY SERVICES, STORM SEWER, SANITARY SEWER, AND STORMWATER CONTROL MEASURE. REMAINING PUBLIC IMPROVEMENTS ALONG MARSH, ORCHARD, AND FLORIDA ST BORDERING THE PHASE SHALL BE COMPLETED.

PHASE 3: MULTI-FAMILY APARTMENT AND TOWNHOME STYLE DEVELOPMENT PHASE TO THE SOUTH AND NORTH SIDES OF THE SITE INCLUDING ALL PARKING, UTILITY SERVICES, STORM SEWER, AND SANITARY SEWER. REMAINING PUBLIC IMPROVEMENTS ALONG MARSH AND FLORIDA ST BORDERING THE PHASE SHALL BE COMPLETED.

PHASE 4: MULTI-FAMILY APARTMENT AND TOWNHOME STYLE DEVELOPMENT PHASE TO THE WEST SIDE OF THE SITE INCLUDING ALL PARKING, UTILITY SERVICES, STORM SEWER, AND SANITARY SEWER. REMAINING PUBLIC IMPROVEMENTS ALONG MARSH, FREEMAN MILL, AND FLORIDA ST BORDERING THE PHASE SHALL BE COMPLETED.



NORTH CAROLINA
PROFESSIONAL
SEAL
38573
ENGINEER
JOSEPH A. CARROLL
12-27-24

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Greensboro Housing Authority

DATE	REVISION DESCRIPTION
11/05/2024	1ST BID ADDENDUM
12/16/2024	FOR CITY OF GREENSBORO CONSTRUCTION DRAWING APPROVAL
01/29/2025	WATER SERVICE MATERIAL REVISION

DATE
05/28/2021

DRAWN BY
M. MARTIN

DESIGNED BY
M. MARTIN

CHECKED BY
A. CARROLL

SCALE
1" = 60'

TIMMONS GROUP

THE ARBORS AT SOUTH CROSSING -TRC

CITY OF GREENSBORO - NORTH CAROLINA

PROJECT PHASING PLAN

JOB NO.
42847

SHEET NO.
C-300A

F

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SECTION 010200 – GENERAL SITEWORK REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SITEWORK LAYOUT

A. Monuments and Benchmarks

1. Maintain all monuments, property corners, bench marks and other reference points.
2. If these are disturbed or destroyed during construction operations, have them replaced by a surveyor licensed in the State of North Carolina. This replacement shall be at no additional expense to the Contract.

B. Laying out the Work.

1. Locate all existing bench marks and other reference points.
2. Protect these points throughout construction.
3. Layout work utilizing these reference points.

C. Record Drawings

1. Maintain a record of the locations of all underground utilities and piping.
2. Maintain a record of any variations of the work.
3. Record Drawings shall be certified by a Land Surveyor registered in the State of North Carolina.
4. Submit these record drawings at Project Closeout.

1.3 MAINTENANCE OF TRAFFIC

A. Maintain vehicular, pedestrian, and delivery vehicle traffic adjacent to this project. Comply with all applicable safety requirements.

1.4 SUBMITTALS

A. Follow Architect’s protocol for submittals requiring review by the Architect’s consultants.

1.5 CORRELATION OF CONSTRUCTION DOCUMENTS

A. Review construction documents thoroughly prior to the start of construction.

B. Report any conflict or discrepancy discovered in the Construction Documents to the Architect prior to the start of construction.

C. Report any conflict or discrepancy discovered between the Construction Documents and state and local governmental regulations to the Architect prior to the start of construction.

1.6 PROJECT CONDITIONS

A. The conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to natural occurrences prior to the start of work.

B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call "NC one call" at 1800-632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities.

C. Should charted, uncharted or incorrectly charted utilities be encountered during demolition, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.1 PROJECT CLEAN UP

A. Clean site as construction progresses. Do not allow trash or other waste materials to accumulate.

B. Prior to requesting the punch-list inspection, clean the site to the following requirements:

1. Power wash all walks and pavements.
2. The remainder of the site shall be broom clean.
3. Remove all trash and debris.

3.2 EXISTING FACILITIES

A. Preserve existing structures, equipment, signs, markers, guardrails and fences in their original condition unless otherwise noted on the plans or unless written permission is obtained for their removal and replacement.

B. Replace damaged items at no additional cost to the Contract.

END OF SECTION 010200

SECTION 01 10 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT INFORMATION

A. Project Identification: Arbor at South Crossing

B. Project No 42847

C. Project Location: 802 West Florida Street, Greensboro, NC 27406

1. Owner: Greensboro Housing Authority

D. Engineer: Timmons Group, 8642 West Market Street, Suite136, Greensboro, NC 27409.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

1. Construction of new multi-family development. Work will generally include:
   a. Site preparation and demolition
   b. Grading and erosion and sediment control
   c. Utility Installation
   d. Concrete Work
   e. Asphalt Paving
   f. Landscaping
   g. Retaining Wall Construction

B. Type of Contract

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

1.4 PHASED CONSTRUCTION

A. The project will be constructed in phases, and the Work shall be coordinated with the Owner who will occupy facilities adjacent to construction activities.

1.5 ACCESS TO SITE

A. General: Contractor shall have use of Project site for construction operations as indicated by requirements of this Section.

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

1.6 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Work shall be performed during normal operating hours.

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 024113 - SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

B. Refer to the Section 012200 for required unit prices.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of existing asphalt and/or concrete pavement, concrete and/or asphalt walks, curbs and gutters, and other exterior site items indicated or not indicated which interfere with the Work.

2. Removal and/or relocation of existing underground utilities and vaults.

3. Removal and disposal of existing sanitary sewer pipe, water pipe, storm drainage pipe and appurtenances indicated. Filling of existing pipes to be abandoned in place.

4. Removal and replacement of fencing.

5. Removal and relocation of existing light & utility poles.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.

C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect items indicated to remain against damage and soiling. When permitted by the Architect, items may be removed to a suitable, protected storage location and then cleaned and reinstalled in their original locations.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, remove demolished materials from the site with further disposition at the Contractor's option.

B. Storage or sale of removed items or materials on-site will not be permitted.

C. Historical 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 the

Owner, which may be encountered, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

1.5 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by the Work.

B. Record drawings at Project closeout.

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.

C. Proposed dust-control measures.

D. Schedule of selective demolition activities indicating the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Interruption of utility services.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
5. Coordination of Owner's continuing occupancy of adjacent facilities.
6. Locations of temporary partitions and means of egress.

E. Inventory of items to be removed and salvaged or turned over to Owner.

F. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: All work shall comply with Federal, State and Local laws and regulations concerning hauling and disposal of demolition debris.

B. Notify the proper agencies prior to the start of work and obtain all necessary permits for this work.

1.7 PROJECT CONDITIONS

A. Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to Owner’s removal and salvage operations prior to the start of demolition work.

B. The location of existing underground utilities indicated is approximate only. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated. Call NC one call at 1-800-632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities.

C. Should charted, uncharted or incorrectly charted utilities be encountered during demolition, contact the Architect immediately for instructions. Cooperate with Owner and utility companies to keep services and facilities in operation.

D. Do not interrupt existing utilities serving facilities occupied and used by the Owner and others, except when permitted in writing by the Owner. Provide acceptable temporary utility service as required to maintain Owner's operations.

1.8 SCHEDULING

A. Owner will occupy portions of the building immediately adjacent to the Work. Conduct selective demolition so that the Owner's operations will not be disrupted. Provide not less than 72 hours notice to Owner of activities that will affect Owner's operations.

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

C. Notify and coordinate any required relocation and/or removal of existing underground utilities, poles, meters or other above ground appurtenances with the appropriate utility company (i.e. power, telephone, cable and natural gas/propane) prior to the start of selective demolition work.

1.9 USE OF EXPLOSIVES

A. Do not use explosives to perform selective site demolition work.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Call NC one call at 1-800-632-4949 prior to the start of demolition work for assistance in the location of existing underground utilities. Field locate all existing underground utilities in the area of work, regardless of whether or not they are indicated.

B. Should uncharted or incorrectly charted existing utilities be identified, contact the Architect immediately for instructions. Provide a scale drawing with the location of the uncharted or incorrectly charted utilities for use by the Architect in preparing additional direction.

C. Verify that utilities indicated as removed, abandoned and/or relocated have been disconnected and capped.

D. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

E. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged and turned over to the Owner.

3.2 PROTECTION OF PERSONS AND PROPERTY

A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks and other adjacent occupied and used facilities.

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

C. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.

1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.

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

D. Barricade areas of demolition occurring as part of this work, and post with warning lights as required by authorities having jurisdiction.

E. Protect structures, buildings, utilities, walks, pavements, existing vegetation and other facilities to remain from damage caused by settlement, lateral movement, undermining, washout and other hazards created by demolition operations.

3.3 POLLUTION CONTROLS

A. Perform all work in accordance with the requirements of the latest edition of the North Carolina Erosion and Sediment Control Planning and Design Manual and those of the local Erosion Control official.

B. Clean adjacent structures and improvements of dust, dirt, and debris caused by the Work. Return adjacent areas to condition existing before start of selective demolition.

3.4 DEMOLITION OF EXISTING FACILITIES

A. Electric Service

1. Coordinate the removal and/or relocation of existing utilities with Power Company.

2. Contact Power Company Representative to arrange for required removal and/or relocation of existing service.

B. Phone Service

1. Coordinate the removal and/or relocation of existing utilities with Phone Company.

2. Contact Phone Company Representative to arrange for required removal and/or relocation of existing service.

C. Cable Television

1. Coordinate the removal and/or relocation of existing utilities with Cable Company.

2. Contact Cable Company Representative to arrange for required removal and/or relocation of existing service.

D. Gas

1. Coordinate the removal and/or relocation of existing utilities with Gas Company.
2. Contact Gas Company Representative to arrange for required removal and/or relocation of existing service.

E. Fiber Optic Lines

1. Coordinate the removal and/or relocation of existing utilities with Fiber Optic Company.
2. Contact Fiber Optic Company Representative to arrange for required removal and/or relocation of existing service.

F. Utilities

1. Coordinate the removal and/or relocation of existing utilities with the appropriate utility companies.
2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and to local jurisdictional codes.
3. Provide adequate means of support and protection during demolition and other construction operations for existing utilities that are to remain in place. Repair utilities damaged by construction operations to the satisfaction of the utility owner.

G. Asphalt Pavement

1. Remove asphalt concrete pavement by sawcutting to the full depth of the pavement. Provide neat sawcuts at the limits of pavement removal indicated.

H. Concrete Pavement, Walks and Curbs

1. Remove concrete pavement and walks to the nearest joint. Sawcut concrete if joints are not present adjacent to the area of demolition.
2. Sawcut concrete along straight lines to a depth of not less than 2 inches. Break out remainder of concrete, provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or sawcut entirely through concrete.

I. Light & Utility Poles

1. Remove and relocate light & utility poles as indicated. If poles are owned by a public utility, coordinate the relocation with them.

J. Fencing

1. Remove existing chain-link fencing as indicated on the drawings.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Do not burn demolished materials or debris.

C. Transport and legally dispose of demolished materials off of Owner's property.

3.6 CLEANUP AND REPAIR

A. Upon completion of demolition work remove all tools, equipment and demolition materials from site. Remove demolition work area protection and leave areas clean.

B. Repair any demolition performed in excess of that required. Return elements of construction and surfaces to remain to the condition existing prior to the start of construction. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION 024113

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protection of existing trees.
2. Clearing and grubbing.
3. Removal of trees and other vegetation.
4. Topsoil stripping.

1.3 DEFINITIONS

A. Remove: Remove and legally dispose of items indicated. Removal includes digging out and off-site disposing of stumps and roots or burning if allowed by local ordinance

B. Tree Protection Zone: The area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

C. Topsoil: Friable, clay loam surface soil, found in varying depths.

1.4 MATERIALS OWNERSHIP

A. Except for stripped topsoil or other materials indicated to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees, plantings and other improvements adjoining the construction that might be misconstrued as damage caused by the Work.

1.6 PROJECT CONDITIONS

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

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect existing improvements on adjoining properties and on Owner's property.

2. Restore existing improvements damaged by clearing operations to their original condition.

C. The conditions existing at the time of inspection for bidding purposes will be maintained by the Owner to the extent practical. However, minor variations may occur due to natural occurrences prior to the start of clearing work.

D. Do not commence site-clearing operations until erosion and sedimentation control measures are in place.

PART 2 - PRODUCTS

2.1 TREE PROTECTION FENCING

A. Tree protection fencing shall conform to NCDEQ standards.

PART 3 – EXECUTION

3.1 PROTECTION OF EXISTING TREES AND VEGETATION

A. Install tree protection fencing as indicated. Erect and maintain a temporary fence around the drip line of individual trees or around the perimeter drip line of groups of trees to remain.

1. Do not store construction materials, debris, topsoil or other excavated material within the tree protection zone.

2. Do not permit vehicles or other equipment within the tree protection zone.

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

B. Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line.

C. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

D. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect.

3.2 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation as required to permit installation of the Work. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of the Work.

B. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation within the clearing limits indicated.

1. Completely remove stumps, roots, and other debris.

2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 6 inches loose depth, and thoroughly compact to a density equal to adjacent original ground.

C. Selective Clearing: Clear areas designated as “Selective Clearing” of all ground covers, underbrush and trees less than 6-inches in diameter at breast height. Coordinate extent of material removed with Architect.
1. Remove trees that appear to be dying or weakening for any reason and at any point during construction up to and including Final Acceptance at the Architect’s direction.

3.3 TOPSOIL STRIPPING

A. Remove heavy growths of grass from areas before stripping.

B. Strip topsoil to whatever depths are encountered, but to a minimum of at least 4 inches.

C. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other material.
1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

D. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

E. Temporarily stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
1. Do not stockpile topsoil within tree protection zones.
2. Stockpile surplus topsoil to allow for respreading deeper topsoil.

F. Dispose of unsuitable or excess topsoil in a legal manner off-site.

3.4 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property: Burning is not allowed.

B. Removal from Owner's Property: Remove waste materials generated by clearing operations from Owner's property and dispose of in a legal manner off-site.
1. Remove waste materials and debris from the site in a manner to prevent spillage. Pavements and the area adjacent to the site shall remain free from mud, dirt and debris at all times.
2. Clean up debris resulting from site clearing operations continuously with the progress of the work.

END OF SECTION 311000

SECTION 312000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

B. Refer to the Section 012100 for required allowances and unit prices.

1.2 SUMMARY

A. This Section includes the following:

1. Excavation, filling, backfilling, and grading indicated and necessary for proper completion of the work.

2. Preparing of subgrade for building slabs, walks, and pavements.

3. Drainage/porous fill course for support of building slabs.

4. Excavating and backfilling of trenches.

5. Excavating and backfilling for underground mechanical and electrical utilities and buried mechanical and electrical appurtenances.

1.3 SUBMITTALS

A. NCDOT approved Job Mix for stone.

B. Imported fill (if required): Submit location of borrow pit and a sample of the soil for approval to the Owner's Geotechnical Engineer a minimum of fourteen (14) working days prior to use

C. Geotextile Fabric

D. Copy of Blasting Permit, approved by authorities having jurisdiction, for record purposes.

1.4 DEFINITIONS

A. Excavation: Removal of all material (except for rock) encountered to design subgrade elevations indicated for cut areas and to subsoil elevations in fill areas. Excavation also includes subsequent respreading, moisture conditioning, compaction, and grading of satisfactory materials removed.

B. Unauthorized Excavation: Removal of materials beyond the limits indicated in the definition of "Excavation" without specific direction of Architect.

C. Additional Excavation: Removal, disposal and replacement of materials beyond the limits indicated in the definition of "Excavation" at the direction of the Architect. Refer to Part 3 of this Section for requirements of Additional Excavation.

D. Subgrade: The undisturbed earth (in cut) or the compacted soil layer (in fill) immediately below granular subbase, drainage fill, or topsoil materials.

E. Subsoil: The undisturbed earth immediately below the existing topsoil layer.

F. Building Pad: The area extending 10 feet beyond the exterior limits of the building/column footings and down to undisturbed soils at a one horizontal to one vertical slope.

G. Structures: The area extending a minimum of ten (10) feet beyond the edge of foundations, slabs, curbs, underground tanks, piping or other man-made stationary features occurring above or below ground surface.

H. Pavements: The area extending 10 feet beyond the exterior limits of paved areas and down to undisturbed soils at a one horizontal to one vertical slope. The area extending 3 feet beyond the exterior limits of walks and down to undisturbed soils at a one horizontal to one vertical slope

I. Subbase Material: Artificially graded mixture of crushed gravel or crushed stone meeting NCDOT specifications. Material type is indicated on the drawings.

J. Drainage/Porous Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel meeting the requirements of NCDOT No. 57 Stone.

K. Rock: Hard bed rock, boulders or similar material requiring the use of rock drills and/or explosives for removal. The criteria for classification of general excavation as rock is any material which cannot be dislodged by a Caterpillar D-8 Tractor, or equivalent, equipped with a single tooth hydraulically operated power ripper. The criteria for trench rock shall be that a Caterpillar 345 Backhoe, or equivalent, with a proper width bucket cannot remove the material.

1.5 ADDITIONAL WORK

A. Earthwork operations are to be considered unclassified with exceptions noted below. Claims for concealed, unknown, or unanticipated subsurface conditions are limited to those circumstances where:

1. Additional excavation work is required below the contract limits indicated to provide acceptable bearing for building pad, structures or pavements.

2. Additional excavation work is required to raise, lower, or revise the footings, foundations or other parts of the building to provide acceptable bearing.

3. Additional excavation work below the utility trench design elevations, for utilities outside the limits of the building, as required to provide acceptable bearing for the utility.

4. Rock is encountered between existing grade and design subgrade.

B. The risks of concealed, unknown, or unanticipated subsurface conditions (except for rock) from existing ground surface to the design subgrade elevations in cut areas and to subsoil elevations in fill areas shall be included in the Contract Amount and shall not be considered as grounds for additional costs to the Contract. The risks of concealed, unknown, or unanticipated subsurface conditions <u>below</u> the elevations stated above shall be considered as Additional Excavation.

C. During construction, if concealed, unknown, or unanticipated subsurface conditions are encountered which require that footings, foundations or other parts of the building be raised, lowered or revised to provide acceptable bearing for the building or if, outside the building limits, additional depth of utility trench excavation below the design subgrade or subsoil elevations is required, immediately notify the Architect upon discovery of such condition prior to disturbing the material encountered.

D. Payment for additional Work

1. Additional excavation shall be counted toward the unit price allowances established in the Bid Form. *The Owner reserves the right to negotiate said unit price allowances prior to the Award of Contract.*

2. Lowering of footings shall be paid for at a negotiated amount. The additional excavation involved shall be counted toward the unit price allowance.

3. Rock removal, if required, shall be counted toward the unit price allowances established in the Bid Form. All rock removal required to complete work other than trenching shall be paid for at the unit price for mass rock removal. Rock payment lines are limited to the following:

   a) Two feet outside of concrete work for which forms are required, except footings.

   b) One foot outside perimeter of footings, two feet below bottom of footings.

   c) In pipe trenches, 6 inches below invert elevation of pipe and 2 feet wider than outside diameter of pipe, but not less than 3 feet minimum trench width.

   d) Outside dimensions of concrete work where no forms are required.

   e) Under slabs on grade, 6 inches below bottom of concrete slab.

4. No payment will be made for unauthorized excavation.

5. The expense of surveying quantities of rock removal and additional excavation shall be included in the unit price allowances.

1.6 EARTHWORK BALANCE ADJUSTMENTS

A. Adjustments of grades may be allowed with prior written approval of the Architect in order to accommodate shortfall or surplus of material that may occur. Should adjustments be allowed, maintenance of designed drainage patterns and required adjustments to drainage structures shall be a Contract responsibility. No additional payment will be made for these adjustments.

B. Should material be required to be imported or exported to achieve the finish grades indicated on the drawings, importation and excavation and disposal off-site in a legal manner of the required material shall be a contract responsibility. No additional payment will be made for these operations.

1.7 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Environmental Compliance:

   1. Comply with the requirements of the latest edition of the North Carolina Erosion and Sediment Control Planning and Design Manual for erosion control during earthwork operations.

C. Testing and Inspection Service: Owner will employ and pay for an independent Geotechnical testing and inspection laboratory to perform soil testing and inspection service during earthwork operations. Cooperate with Owner's Geotechnical Engineer as required for testing and inspection of work. These services do not relieve the responsibility for compliance with Contract Document requirements.

1.8 PROJECT CONDITIONS

A. Site Information: Data concerning subsurface materials or conditions, which are based on test borings, have been obtained by the Owner for his use in designing the project. This data is contained in a reports titled “Smith Homes – Greensboro, NC and dated December 22, 2018 and October 31, 2019. These reports is included in this project manual for information only.

1. The accuracy or completeness of the data is not warranted or guaranteed by the Owner or the Architect/Engineer, and in no event shall be considered part of the Contract Documents. The Owner and Architect/Engineer expressly disclaim any responsibility for the data as being representative of the conditions and materials that may be encountered.

B. Bidders and interested parties (prior to receipt of bids) are encouraged to conduct their own soil and subsurface investigations, examinations, tests, and exploratory borings to determine the nature of the soil conditions underlying the project site. Contact the Owner's office to make an appointment to enter the site for the purpose of conducting your own investigation prior to bid.

C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner of others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.

1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without receiving Architect’s written permission.

3. Existing utilities across or along the line of work are indicated only in an approximate location. Locate all underground lines and structures. Call “NC one call” at 1-800-632-4949 prior to construction. If utilities are marked that are not shown on the plans, locate utility vertically and horizontally and provide information to architect. Repair and correct any damage to underground lines and structures.

1.9 SAFETY

A. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction and governing regulations and standards.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CL, ML, GC, SC, GW, GP, GM, SM, SW, and SP.

B. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups CH, OL, OH, MH, and PT. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at the time of compaction.

C. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 4 inches in any dimension (2 inches for material used in trench backfill), debris, waste, frozen materials, vegetation and other deleterious matter.

D. Imported material for structural fill shall comply with ASTM D2487 soil classification groups CL, ML, GC, SC, GW, GP, GM, SM, SW, and SP.

2.2 ACCESSORIES

A. Non-woven Geotextile Fabric (for drainage): Mirafi 140N, or equivalent.

B. Woven Geotextile Fabric (for reinforcement): AMOCO 2002, or equivalent.

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 and maintain erosion and sedimentation controls during earthwork operations.

3.2 DEWATERING

A. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrade and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use utility trench excavations as temporary drainage ditches.

B. Should any springs or running water be encountered in the excavation, notify the Architect and provide discharge by trenches (or other acceptable means) and drain to an appropriate point of disposal. Provide temporary drainage facilities to minimize the flow of rainwater onto adjacent property. Repair any damage to property or to subgrade as a result of construction and/or dewatering (or lack thereof) operations at no additional cost to the Contract. If permanent provision must be made for disposal of water other than as indicated, the Contract price shall be adjusted.

3.3 EXPLOSIVES

A. Blasting may be done only if authorized by the Owner and local authorities having jurisdiction. When explosives are used, experienced powdermen or persons who are licensed or otherwise authorized to use explosives shall execute the work. Explosives shall be stored, handled, and used in accordance with local regulations and with the “Manual of Accident Prevention in Construction” of

the Associated General Contractor of America, Inc. Correct any damage to foundations or other work caused by use of explosives. Meeting the requirements of the blasting permit, if issued, is a Contract responsibility.

3.4 EXCAVATION

A. Excavation consists of removal, placement and disposal of material encountered when establishing required subgrade or finish grade elevations.

1. Excavation includes removal and disposal of pavements and other obstructions visible on ground surface; underground structures, utilities and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

B. Rock Excavation: If Rock is encountered the Owner's Geotechnical Engineer will verify that the material qualifies for classification as rock excavation.

1. If rock is encountered in grading, remove to depths as follows:

a) Under surfaced areas, to 6" under the respective subgrade for such areas.

b) Under grass and planted areas - 12" minimum.

c) Under footings – Two feet below bottom of footing, One foot outside of perimeter of footing.

d) Under trenches – 6" below bottom of trench.

2. After the Owner's Geotechnical Engineer verified that the material is rock, Contractor shall employ a surveyor licensed in the State of North Carolina to calculate the quantity of material removed as Rock Excavation. The quantity of rock calculated shall not exceed the volume determined by the payment limits. The Owner's Project Representative shall review the quantity calculated within 48 hours of receiving the survey notes.

3.5 EXCAVATION FOR BUILDING PAD AND STRUCTURES

A. Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction and for review.

B. Excavations for footings and foundations: Do not disturb bottoms of excavation. Excavate by hand to elevations required just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

1. Where rock is encountered, carry excavation to required elevations and backfill with crushed stone prior to installation of footing.

C. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot plus a sufficient distance to permit placing and removal of concrete formwork, installation of services, other construction and for review. Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches of clearance on both sides of pipe or conduit.

B. Excavate trenches to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1. Where rock is encountered, carry excavation to required elevations and backfill with NCDOT #57 crushed stone prior to installation of pipe.

2. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, do not excavate beyond indicated depths. Hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil.

3. For pipes and equipment 6 inches or larger in nominal size, shape bottom of trench to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Fill depressions with tamped sand backfill. At each pipe joint, dig bell holes to relieve pipe bell of loads ensure continuous bearing of pipe barrel on bearing surface.

3.8 EXCAVATION STABILITY

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

3.9 SUBGRADE INSPECTION

A. Notify Architect when mass, trench and footing excavations have reached required subgrade. The Architect will arrange for an inspection of conditions by the Owner's Geotechnical Engineer. *Alternative procedures for arranging this review may be implemented at the Owner's written option.*

B. If the Owner's Geotechnical Engineer determines that the subgrade bearing conditions are unacceptable, the Architect will authorize additional excavation until suitable bearing conditions are encountered.

C. Proof-roll subgrade with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.

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

D. Under supervision of the Owner's Geotechnical Engineer, proofroll subgrade in cut areas below the building pad and pavement(s) with a loaded dump truck or other approved pneumatic tired vehicle. Should any unstable sub-soil be encountered below pavement or structures, break up the top eight inches of ground surface, pulverize, moisture-condition to optimum moisture content, and compact to percentage of maximum density as stated in Percentage of Maximum Density Requirements. Perform this work at no additional cost and/or time to the Contract.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.10 ADDITIONAL EXCAVATION

A. Additional Excavation (Mass): Remove excavated materials and dispose of off-site as directed by the Architect. Replace this excavated material with satisfactory material placed and compacted according to the requirements of the "Placement and Compaction" section.

B. Additional Excavation in Trenches: Remove excavated materials and dispose of off-site as directed by the Architect. Replace this excavated material with stone.

C. Additional Excavation in Footings: Remove excavated materials and dispose of off-site as directed by the Architect. Replace this excavated material with lean concrete/flowable fill or with stone extending 12 inches laterally beyond the footing in all directions.

D. The quantity of material removed as Additional Excavation (Mass, Trench or Footing) shall be calculated by a surveyor licensed in the State of North Carolina and employed by the Contractor. The Owner's Project Representative shall review the quantity calculated within 48 hours of receiving the survey notes.

E. Protect the subgrade during construction. During wet conditions, the subgrade soils may become saturated and soften, possibly resulting in damage to the subgrade if disturbed by equipment. Correct subgrade damaged in this manner. No additional payment will be made to correct subgrade damaged in this manner.

3.11 UNAUTHORIZED EXCAVATION

A. Correct Unauthorized Excavation as follows:

1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to Architect.

2. Elsewhere, backfill and compact unauthorized excavations as indicated for authorized excavations of same classification unless otherwise directed by Architect.

3.12 STORAGE OF EXCAVATED MATERIALS

A. Temporarily stockpile excavated materials acceptable for use as backfill and fill. Place, grade, and shape stockpiles for proper drainage. Cover to prevent windblown dust.

1. Stockpile excavated materials away from edge of excavations. Do not store within the drip line of trees to remain.

3.13 BACKFILL AND FILL

A. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance by local authority having jurisdiction of construction below finished grade, including perimeter insulation.
2. Review, approval, and recording of the locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of shoring and bracing (including backfilling of voids with satisfactory materials).
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow or ice.

C. Ground Surface Preparation: Remove vegetation, debris, obstructions, and deleterious materials from ground surface prior to placement of fills.

D. Bench sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material. Plow, scarify, bench or break up sloped surfaces flatter than 1 vertical to 4 horizontal so fill material will bond with existing material.

E. Place soil material in layers to required subgrade elevations, for each area classification listed below, using materials indicated in Part 2 of this Section.

1. Under grassed areas, use satisfactory excavated or borrow material.
2. Under walks, curbs, and pavements, use satisfactory excavated or borrow material.
3. Under building slabs, use satisfactory excavated or borrow materials and drainage/porous fill material as indicated.

3.14 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

D. Provide 4-inch- thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase.

E. Place and compact initial backfill free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the utility pipe or conduit.

G. Backfill voids with satisfactory soil while installing and removing shoring and bracing.

H. Place and compact final backfill of satisfactory soil to final subgrade elevation.

I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

J. All underground utility lines outside the building footprint, except lawn irrigation lines, shall be required to have a warning tape installed in the back between 6" and 24" below finished grade directly over piping.

1. Metallic lines shall be identified with durable printed plastic warning tapes, minimum 3" wide with lettering to identify buried line below.

2. Non-metallic pipes, other than gas lines, shall be identified by detectable warning tape, minimum 2" wide, with lettering to identify buried line below.

3. 2012 Fuel Gas Code, Section 404.13.3 Tracer: an insulated copper tracer wire or other approved conductor shall be installed adjacent to underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate above ground at the end of the non-metallic piping. The tracer wire size shall not be less than 18 AWG and the insulation type suitable for direct burial.

K. Do not backfill trenches until any required testing and inspections have been completed and Architect authorizes backfilling. Backfill carefully to avoid damage or displacement of pipe systems.

L. Under piping and conduit and equipment, use crushed stone where required over rock bearing surface and for correction of unauthorized excavation. Shape excavation bottom to fit bottom 90 degrees of cylinder.

M. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

3.15 SOIL MOISTURE CONTROL

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

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

2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

B. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or

subsequent to compaction operations. Maintain the moisture content of the structural fill materials to within 2% or as required by Owner's Geotechnical Engineer of the optimum moisture content until permanently covered.

C. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to required density.

1. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

2. Work wet materials as directed by the Owner's Geotechnical Engineer. Base bids on working material daily for a maximum of five days of acceptable weather.

3. No additional payment will be made for these operations.

3.16 COMPACTION OF SOIL BACKFILL AND FILLS

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. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

C. Control soil and fill compaction, providing minimum percentage of density indicated for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect if soil density tests indicate inadequate compaction.

D. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density at a moisture content within 2% of optimum or as required by Owner's Geotechnical Engineer in accordance with ASTM D698:

1. Under structures and footings, compact each layer of backfill or fill material at 100 percent maximum density (refer to structural drawings and specifications for additional information).

2. Under pavements, compact each layer of backfill or fill material more than 12 inches below the finish subgrade elevation at 95 percent maximum density. Compact each layer of backfill or fill material more within 12 inches of finish subgrade elevation at 98 percent maximum density This includes ground under future expansion areas.

3. Under grass or unpaved areas, compact each layer of backfill or fill material at 90 percent maximum density.

E. Seal all fill areas at the end of each working day, utilizing a smooth drum roller.

3.17 GRADING

A. General: Rough grading of areas within the Project, including cut and fill sections and adjacent transition areas, shall be reasonably smooth, compacted and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or motor patrol except as otherwise indicated. The finished subgrade surface from the grassed areas generally shall be not more than 0.2 feet above or below the final grade or approved cross section, with due allowance for topsoil.

B. The tolerance for areas within 10 feet of building perimeter, walks and all areas to be paved shall not exceed 0.10 feet above or below the established subgrade. Finish all ditches, swales and gutters to drain readily. Unless otherwise indicated, evenly slope the subgrade to provide drainage away from building walls in all directions at a grade not less than ¼ inch per foot. Provide rounding at top and bottom of cut and fill slopes and at other breaks in grade.

C. Protection of Graded Areas: Protect newly graded areas and areas of cut, fill and design/subgrade elevations from the actions of the elements and from deterioration as a result of construction operations and weather conditions (frost, rains, snow, sleet, hail, etc.). Repair any settlement or washing that occurs prior to or after acceptance of the work. Fill to required subgrade levels any areas where settlement occurs. Protect trees to remain, and, at all areas of the Site where construction operations are in progress, provide protection for the safety of occupants of the existing facilities.

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

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

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

E. 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 1 inch.

2. Walks: Plus or minus 1 inch.

3. Pavements: Plus or minus ½ inch.

F. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 PAVEMENT SUBBASE COURSE:

A. General: Place subbase material, in layers of indicated thickness, over subgrade surface to support a pavement base course.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders: Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least at 12” width of shoulder simultaneously with compacting and rolling each layer of subbase course.

D. Placing: Place subbase course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations.

E. When a compacted subbase course is 6” thick or less, place material in a single layer. When more than 6” thick, place material in equal layers, except no single layer more than 6” or less than 3” in thickness when compacted.

F. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

G. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course to required crown elevations and cross-slope grades.
4. Place subbase course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

H. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.19 BUILDING SLAB DRAINAGE COURSE

A. General: Place drainage/porous fill material, over subgrade surface to support concrete building slabs and sidewalks areas indicated.

B. Place drainage course on subgrades free of mud, frost, snow, or ice.

C. Placing: Place drainage/porous fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

D. When a compacted drainage course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.20 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

1. If in the opinion of the Architect, based on testing service reports and inspection, subgrade or fills have been placed that are below required density, perform additional compaction and testing until required density is obtained.

B. The Owner will engage, and pay for, the services of a Geotechnical Engineer whose function shall be to afford complete engineering control by testing of the conditions of all footing subgrades, the placement of all structural fills under structures, building pad and pavement areas, and all compaction where required, and to observe the proof rolling of the building pad and pavement areas.

C. The Owner’s Geotechnical Engineer will be present as deemed necessary during all phases of the Work requiring filling, compaction operations or testing. The Geotechnical Engineer will provide the Architect with written certification that fill and compaction was completed with accepted materials in accordance with the Documents, and give a professional opinion regarding shrinkage or settlement of fill and safe load bearing capacity of fill.

D. Site Preparation and Proofrolling: The Owner's Geotechnical Engineer will determine if any additional excavation or in-place densification is necessary to prepare a subgrade for fill placement for slab or pavement support.

E. Fill Placement and Compaction: The Owner's Geotechnical Engineer will witness all fill operations and take sufficient in-place density tests to verify that the indicated degree of fill compaction is achieved. The Owner's Geotechnical Engineer will observe and approve borrow materials used and shall determine if their existing moisture contents are suitable/acceptable.

F. Footing Excavation Review: The Owner's Geotechnical Engineer will review the footing excavations for the building foundations. He will verify that the design bearing pressures are available and that no loose or soft areas exist beneath the bearing surfaces of the footing excavations.

G. The Owner's Geotechnical Engineer will submit copies of his reports, recommendations and/or opinions to the Architect/Engineer and the Owner. Pertinent information will be provided to the Contractor as required.

3.21 EROSION CONTROL:

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction, the North Carolina Erosion and Sediment Control Handbook, and as indicated in the Contract Documents.

3.22 PROTECTION

A. Repair and reestablish grades in settled, eroded, and rutted areas to indicated tolerances.

B. Reconditioning Compacted Areas: Where subsequent construction operations or adverse weather disturbs completed compacted areas, scarify surface, reshape, and compact to required density prior to further construction.

C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

D. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.23 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner's Property: Remove excess and/or waste materials, including trash and debris, and dispose of it off Owner's property in a legal manner.

B. Dispose of excess material and materials not acceptable for use as backfill or fill legally offsite.

C. Do not remove topsoil from site until it has been demonstrated to the Owner's satisfaction that it is excess.

END OF SECTION 312000

SECTION 312500 - EROSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The provisions of the Contract Documents apply to the work of this Section.

B. The North Carolina Erosion and Sediment Control Planning and Design Manual, latest edition.

1.2 SUMMARY

A. This Section includes the installation, maintenance and removal of erosion control measures required for prevention of sediment leaving the project site.

1.3 EROSION AND SEDIMENT CONTROL PERMIT

A. Prior to commencement of work, obtain a copy of the approved Erosion and Sediment Control Plan & permit.

B. Schedule a pre-construction conference on-site with the Architect and NCDEQ Environmental Inspector. Hold this meeting prior to the start of any construction activities.

1.4 SUBMITTALS

A. Copies of the weekly Erosion Control Measure inspection reports. These may be submitted at the monthly progress meetings.

B. Applicable Erosion Control Products.

PART 2 - PRODUCTS

2.1 EROSION CONTROL PRODUCTS:

A. Safety Fence

1. 6’ high chain link fence.

B. Construction Entrance

1. Heavy-duty stone aggregate and filter fabric construction entrance, complying with the requirements of Section 6.06 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

2. The water source for washing operations shall be the responsibility of the Contractor.

C. Sediment Fence

1. Synthetic filter fabric, complying with the requirements of Section 6.62 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

2. Steel posts 1.33 lb/lf with a minimum length of 5 feet.

D. Storm Drain Inlet Protection

1. Hardware cloth and gravel inlet protection, complying with the requirements of Section 6.51 of the North Carolina Erosion and Sediment Control Planning and Design Manual.
2. Block and Gravel Curb Inlet Sediment Filter complying with the requirements of Section 6.52 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

E. Riprap

1. A layer of stone designed to protect and stabilize areas subject to erosion, complying with Section 6.15 of the North Carolina Erosion and Sediment Control Planning and Design Manual.
2. The size of the stone required is indicated on the drawings.

F. Culvert Inlet Protection

1. Rock pipe inlet protection, complying with Section 6.55 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

G. Temporary Seeding

1. Planting rapid growing annual grasses, small grains or legumes to provide initial temporary cover for erosion control on disturbed areas, complying with Section 6.10 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

H. Temporary Diversion

1. A temporary ridge or excavated channel or combination ridge and channel constructed across sloping land on a predetermined grade, complying with Section 6.20 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

I. Temporary Skimmer Basin

1. A small, temporary ponding basin formed by an embankment or excavation to capture sediment, complying with Section 6.60 of the North Carolina Erosion and Sediment Control Planning and Design Manual and to the details indicated on the Drawings.

J. Outlet Protection

1. A structure designed to control erosion at the outlet of a channel or conduit, complying with Section 3.40.1 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

K. Dewatering Structure

1. A temporary filtering device used for dewatering operations, complying with the requirements of Sections 6.62 and 6.65 of the North Carolina Erosion and Sediment Control Planning and Design Manual.

PART 3 - EXECUTION

3.1 INSTALLATION OF EROSION CONTROL MEASURES

A. Install all erosion and sediment control measures per the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

B. Protect all points of construction ingress and egress to the site to prevent tracking of mud onto public streets. Provide temporary construction entrances at all points of access to the site.

C. Clear only those areas necessary for installation of the perimeter erosion control measures. The balance of the site shall not be cleared or otherwise disturbed until the perimeter erosion control measures are installed, functional and approved by the NCDEQ Environmental Inspector.

D. Follow the construction sequence and install erosion control measures as indicated on the Drawings and as directed by the NCDEQ Environmental Inspector.

E. Install additional measures as necessary to prevent sediment from leaving the project site.

3.2 MAINTENANCE OF EROSION CONTROL MEASURES

A. Maintain all erosion and sediment control measures per the requirements of the North Carolina Erosion and Sediment Control Planning and Design Manual.

B. At a minimum, the following maintenance is required:

1. Safety Fence
    a) Review fence regularly for damage. Repair any damage immediately.
    b) Secure the fence at the end of each working day. Repair or replace all locking devices as necessary.
2. Construction Entrance
    a) Wash and rework stone and/or place additional stone as required to prevent tracking of mud onto the roadways.
    b) Clean out the sediment-trapping device for the washrack.
    c) Remove all materials spilled, dropped, washed or otherwise tracked onto roadways or into storm sewers immediately. Do not use water trucks to wash the roadways.
3. Sediment Fence
    a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
    b) Make any required repairs immediately. Give special attention to damage resulting from end-runs and undercutting.
    c) Replace fabric that is decomposing or is otherwise ineffective.
    d) Clean out accumulated sediment following every storm event. Do not allow sediment to accumulate higher than one-half the height of the barrier.
4. Storm Drain Inlet Protection
    a) Inspect immediately following each rainfall and at least daily during prolonged rainfall.
    b) Remove and clean or replace stone filters that have been clogged with sediment. Make any required repairs immediately.

c) Remove accumulated sediment as required. Do not allow sediment to accumulate higher than one-half the height of the measure.

d) Remove and replace sediment bag/silt sack inlet protection that has been clogged with sediment.

5. Riprap

a) Inspect riprap following every storm event. Re-lay riprap as necessary to prevent concentrated flow from running under or around the riprap.

b) Clean out accumulated sediment from the riprap.

6. Temporary Skimmer Basin

a) Remove sediment and restore the trap to its original dimensions once the sediment accumulates to the cleanout level. Refer to the drawings for the appropriate cleanout level elevations.

b) Any pumping shall be discharged through an approved dewatering structure.

c) Remove and clean or replace stone choked with sediment.

d) Regularly check the structure to ensure that it is structurally sound. Immediately repair any damage discovered.

7. Outlet Protection

a) Inspect outlet protection following every storm event. Re-lay riprap as necessary to prevent concentrated flow from running across the outlet protection.

8. Temporary Seeding

a) Re-seed and mulch areas where cover is inadequate to protect against erosion until adequate cover is obtained.

C. Remove accumulated sediment as required and at appropriate intervals to maintain the effective function of all erosion control measures.

D. Inspect, repair and remove accumulated sediment from erosion control measures following significant (greater than ½") rainfall events.

E. If erosion control measures become clogged, causing the impoundment of water, restore the measures immediately. Ponded water poses a potential drowning hazard and shall be relieved immediately by either pumping (through an approved dewatering structure) or by removal of the blockage.

3.3 REMOVAL OF EROSION CONTROL MEASURES

A. Remove all temporary erosion control measures following the stabilization of the site. Do not remove erosion control measures until authorized by the NCDEQ Environmental Inspector.

B. Topsoil, permanently seed and stabilize areas occupied by erosion control measures.

END OF SECTION 312500

SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

A. This Section includes soil treatment for termite control.

1.3 SUBMITTALS

A. Product data and application instructions.

B. Certification that products used comply with U.S. Environmental Protection Agency (EPA) regulations for termiticides.

1.4 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for preparing substrate and application.

B. Engage a professional pest control operator who is licensed according to regulations of governing authorities to apply soil treatment solution.

C. Use only termiticides that bear a federal registration number of the EPA and are approved by local authorities having jurisdiction.

1.5 JOB CONDITIONS

A. Restrictions: Do not apply soil treatment solution until excavating, filling, and grading operations are completed, except as otherwise required in construction operations.

B. To ensure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

1.6 WARRANTY

A. Warranty: Furnish written warranty, executed by Applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

B. Warranty Period: 5 years from date of Final Acceptance. Also, include a renewable warranty for the Owner’s future consideration.

C. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT SOLUTION:

A. Use an emusible concentrate insecticide for dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent. Provide a working solution of one of the following chemical elements and concentrations:

1. Cypermethrin (Demon TC) 0.5% in water emulsion.

B. Other solutions may be used as recommended by Applicator and if acceptable to local governing authorities. Use only soil treatment solutions that are not injurious to planting.

PART 3 - EXECUTION

3.1 APPLICATION

A. Surface Preparation: Remove foreign matter that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placing compacted fill under slabs if recommended by toxicant manufacturer.

B. Application Rates: Apply soil treatment solution as follows:

1. Under slab-on-grade structures, treat soil before concrete slabs are placed, using the following application rates:

a) Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) to soil in critical areas under slab, including entire inside perimeter of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footers.

b) Apply 1 gallon of chemical solution per 10 sq. ft. (4.1 L of chemical solution per sq. m) as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallon of chemical solution per 10 sq. ft. (6.1 L of chemical solution per sq. m) to areas where fill is washed gravel or other coarse absorbent material.

c) Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench for each 12 inches (300 mm) of depth from grade to footing, along outside edge of building. Dig a trench 6 to 8 inches (150 to 200 mm) wide along outside of foundation to a depth of not less than 12 inches (300 mm). Punch holes to top of footing at not more than 12 inches (300 mm) o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in the trench.

2. Under crawlspace and basement structures, treat soil along exterior and interior walls of foundations with shallow footings as specified above for exterior of slab-on-grade structures.

3. Treat soil under or around crawlspace structures as follows:

a) Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench along inside of foundation walls, along both sides of interior partitions, and around piers and plumbing. Do not apply an overall treatment in crawlspaces.

b) Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) of trench, for each 12 inches (300 mm) of depth from grade to footing, along outside of foundation walls, including part beneath entrance platform porches, etc.

c) Apply 4 gallons of chemical solution per 10 linear feet (5.1 L of chemical solution per meter) along the inside and outside of foundation walls of porches.

d) Apply 1 gallon of chemical solution per 10 sq. ft. (4.1 L of chemical solution per sq. m) of soil surface as an overall treatment only where attached concrete platform and porches are on fill or ground.

4. At hollow masonry foundations or grade beams, treat voids at rate of 2 gallons per 10 linear feet 2.6 L per meter, poured directly into the hollow spaces.

5. At expansion joints, control joints, and areas where slabs will be penetrated, apply at rate of 4 gallons per 10 linear feet (5.1 L per linear m) of penetration.

C. Post signs in areas of application to warn workers that soil termiticide treatment has been applied. Remove signs after areas are covered by other construction.

D. Reapply soil treatment solution to areas disturbed by subsequent excavation, landscape grading, or other construction activities following application.

E. Allow not less than 12 hours drying time after application before beginning concrete placement or other construction activities.

END OF SECTION 313116

SECTION 321216 - ASPHALT PAVEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hot-mix asphalt paving over prepared subbase.
2. Hot –mix asphalt patching.
3. Hot-mix asphalt overlays.
4. Asphalt surface treatments

1.3 SUBMITTALS

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

B. Material Certificates: Certificates signed by manufacturers certifying that each material complies with requirements.

C. Traffic maintenance and Work Area Protection Plan: Submit a plan indicating sequencing and measures to be used for the maintenance and protection of traffic during operations within or immediately adjacent to existing roadways open to vehicular traffic. The Architect must approve this plan prior to commencement of work within the Right-of-Way.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Asphalt paving materials and installation shall conform to the requirements of the latest edition of the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro Standards.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if substrate is wet or excessively damp or if the following conditions are not met:

1. Tack Coats: Minimum ambient temperature of 50 deg F (10 deg C), and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application.

2. Asphalt Base Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.
3. Asphalt Surface Course: Minimum surface temperature of 40 deg F (4 deg C) and rising at time of placement.

1.6 TESTING AND INSPECTION

A. Within the road Right-of-Way, Greensboro inspectors shall observe the asphalt placement. Coordinate the necessary inspection schedule with the City of Greensboro.

B. The Owner's testing agency will observe the asphalt placement in the parking lots and on-site areas not in Right-of-Way.

PART 2 - PRODUCTS

2.1 ASPHALT-AGGREGATE MIXTURE

A. General: Provide plant-mixed, hot-laid asphalt-aggregate mixture complying with the requirements of the NCDOT Standard Specifications for Roads and Structures and as recommended by local paving authorities to suit project conditions.

2.2 ASPHALT MATERIALS

A. Tack Coat: ASTM D 977, emulsified asphalt or ASTM D 2397, cationic emulsified asphalt, slow setting, factory diluted in water, of suitable grade and consistency for application.

2.3 AUXILIARY MATERIALS

A. Paving Geotextile: Nonwoven polypropylene, specifically designed for paving applications, resistant to chemical attack, rot, and mildew.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to support paving and imposed loads.

B. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction.

C. Notify Architect in writing of any unsatisfactory conditions. Do not begin paving installation until these conditions have been satisfactorily corrected.

3.2 MAINTENANCE AND PROTECTION OF TRAFFIC

A. Utilize flagmen, barricades, warning signs and warning lights as required by the NCDOT Traffic Maintenance Manual and City of Greensboro Standards.

3.3 PATCHING AND REPAIRS

A. Patching: Saw cut perimeter of patch and excavate existing pavement section to sound base. Recompact new subgrade. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically.

1. Tack coat faces of excavation and allow to cure before paving.

2. Fill excavation with dense-graded, hot-mix asphalt base mix and, while still hot, compact flush with adjacent surface.

B. Leveling Course: Install and compact leveling course consisting of dense-graded, hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

C. Crack and Joint Filling: Remove existing filler material from cracks or joints to a depth of 1/4 inch (6 mm). Refill with asphalt joint-filling material to restore watertight condition. Remove excess filler that has accumulated near cracks or joints.

D. Tack Coat: Apply uniformly to existing surfaces of previously constructed asphalt or Portland cement concrete paving and to surfaces abutting or projecting into new, hot-mix asphalt pavement. Apply at a uniform rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m) of surface.

1. Allow tack coat to cure undisturbed before paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillage and clean affected surfaces.

3.4 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. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

C. Base course to be compacted to 100 percent of the Modified Proctor (ASTM D-1557) maximum dry density.

3.5 GEOTEXTILE INSTALLATION

A. Apply bond coat, consisting of asphalt cement, uniformly to existing surfaces at a rate of 0.20 to 0.30 gal./sq. yd. (0.8 to 1.2 L/sq. m).

B. Place paving geotextile promptly according to manufacturer's written instructions. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 4 inches (100 mm) and transverse joints 6 inches (150 mm).

1. Protect paving geotextile from traffic and other damage and place overlay paving the same day.

3.6 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt mix 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 thickness indicated.

   2. Spread mix at minimum temperature of 225 deg F (107 deg C).

B. Place paving in consecutive strips not less than 10 feet (3 m) wide, except where 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 asphalt base course for a section before placing intermediate or surface courses.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.7 JOINTS

A. Construct joints between old and new pavement, or between successive days work, to ensure 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.

   2. Offset longitudinal joints in successive courses a minimum of 6 inches (150 mm).

   3. Offset transverse joints in successive courses a minimum of 24 inches (600 mm).

   4. Construct transverse joints as required by the NCDOT Standard Specifications for Roads and Structures.

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

3.8 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

   1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Repair surfaces by loosening displaced material, filling with hot-mix asphalt, and rerolling to required elevations.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling, while hot-mix asphalt is still hot enough to achieve indicated density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference laboratory density according to ASTM D 1559.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm. Surface course average density shall be 90 percent SF9.5A and 92 percent S9.5B of reference laboratory density.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while still hot, with back of rake or smooth iron. Compact thoroughly using tamper or other satisfactory method. Edges adjacent to curbs and curb and gutter sections shall be flush with the edge of concrete.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials. Remove paving course over area affected and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

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

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

3.9 INSTALLATION TOLERANCES

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

1. Base Course: Plus or minus 1/2 inch (13 mm).

2. Surface Course: Plus 1/4 inch (6 mm), no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch (6 mm).

2. Surface Course: 3/16 inch (3 mm).

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).

C. Check surface areas at intervals as directed by Architect.

3.10 ASPHALT PAVEMENT OVERLAY

A. Mill at edges in accordance with the NCDOT and City of Greensboro standards.

3.11 FIELD QUALITY CONTROL

A. Within the Right-of-Way, coordinate required inspections with the City of Greensboro.

B. Testing Agency: Owner will engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.

1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from requirements.

C. Additional testing, at Contractor's expense, will be performed to determine compliance of corrected Work with requirements.

D. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with requirements.

END OF SECTION 321216

SECTION 321313 - SITE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 DESCRIPTION OF WORK:

A. Extent of Portland cement concrete paving is shown on drawings, including:

1. Curbs and gutters
2. Walkways
3. Service area pavement.

1.3 SUBMITTALS

A. Provide certification that all materials meet NCDOT standards for the class of concrete required.

1.4 JOB CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects.

1. Use flexible spring steel forms or laminated boards to form radius bends as required.
2. Coat forms with a nonstaining form release agent that will not discolor or deface surface of concrete.

B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185.

C. Reinforcing Steel: ASTM A 615, Grade 60, deformed

D. Concrete Materials: Comply with requirements of NCDOT Standard Specifications for Roads and Structures for concrete materials, admixtures, bonding materials, curing materials, and others as required.

E. Expansion Joint Materials: Comply with requirements of applicable NCDOT Standard Specifications for Roads and Structures sections for preformed expansion joint fillers and sealers.

F. Antispalling Compound: Combination of boiled linseed oil and mineral spirits, complying with AASHTO M-233.

G. Liquid-Membrane Forming and Sealing Curing Compound: Comply with NCDOT Standard Specifications for Roads and Structures.

2.2 CONCRETE MIX, DESIGN, AND TESTING

A. Comply with requirements of applicable NCDOT Standard Specifications for Roads and Structures for concrete mix design, sampling and testing, and quality control.

B. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, water-reducing or high-range water-reducing admixture (superplasticizer), air-entraining admixture, and water to produce the following properties:

1. Comply with the requirements of NCDOT Standard Specifications for Roads and Structures, unless otherwise indicated.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

B. Proof-roll prepared subbase surface to check for unstable areas and need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving.

3.2 FORM CONSTRUCTION

A. Set forms to required grades and lines, braced and secured. Install forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork for grade and alignment to following tolerances:

1. Top of forms not more than 1/8 inch in 10 feet.

2. Vertical face on longitudinal axis, not more than 1/4 inches in 10 feet.

C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3 REINFORCEMENT

A. Locate, place and support reinforcement as specified in NCDOT Standard Specifications for Roads and Structures, unless otherwise indicated.

3.4 CONCRETE PLACEMENT

A. General: Comply with requirements of NCDOT Standard Specifications for Roads and Structures sections for mixing and placing concrete.

B. Do not place concrete until subbase and forms have been checked for line and grade. Moisten subbase if required 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.

C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with 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 dislocation of reinforcing, dowels, and joint devices.

D. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If interrupted for more than 1/2 hour, place a construction joint.

E. Fabricated Bar Mats: Keep mats clean and free from excessive rust, and 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 to adjacent mats.

F. Place concrete in 2 operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.

G. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Architect.

H. Curbs and Gutters: Automatic machine may be used for curb and gutter placement. If machine placement is to be used, submit revised mix design and laboratory test results that meet or exceed minimums indicated. Machine placement must produce curbs and gutters to required cross-section, lines, grades, finish, and jointing as indicated for formed concrete. If results are not acceptable, remove and replace with formed concrete meeting requirements.

3.5 JOINTS

A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.

B. Weakened-Plane (Contraction) Joints: Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness, as follows:

1. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.

2. Sawed Joints: Form weakened-plane joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.

3. Inserts: Use embedded strips of metal or sealed wood to form weakened-plane joints. Set strips into plastic concrete and carefully remove strips after concrete has hardened.

C. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.

1. Construct joints as indicated or, if not indicated, use standard metal keyway-section forms.

D. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects, unless otherwise indicated.

E. Locate expansion joints at 20 feet o.c. for each pavement lane unless otherwise indicated.

F. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. If no joint sealer, place top of joint filler flush with finished concrete surface.

G. Provide joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

H. Protect top edge of joint filler during concrete placement with a metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

I. Fillers and Sealants: Comply with requirements of applicable NCDOT Standard Specifications for Roads and Structures sections for preparation of joints, materials, installation, and performance.

J. Refer Drawings for scoring patterns.

3.6 CONCRETE FINISHING

A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10-ft. straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous smooth finish.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows:

1. Broom finish by drawing a fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide a fine line texture acceptable to Architect.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed by Architect.

3.7 CURING

A. Protect and cure finished concrete paving in compliance with applicable requirements of Division 3 sections. Use membrane-forming curing and sealing compound or approved moist-curing methods.

3.8 REPAIRS AND PROTECTIONS

A. Repair or replace cracked, broken or defective concrete curbs and curb and gutter, as directed by Architect.

B. Replace cracked, broken or defective concrete sidewalks.

C. Repair or replace cracked, broken or defective concrete pavement, as directed by Architect.

D. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

E. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

F. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just before final inspection.

END OF SECTION 321313

SECTION 321700 - PAVEMENT MARKINGS, SIGNS AND SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Establishing the location of pavement markings and applying pavement markings for parking space lines, traffic control, fire lane and accessible spaces.
2. Installation of signs for traffic control and accessible spaces.
3. Installation of wheel stops at parking spaces.

1.3 QUALITY ASSURANCE

A. All work and materials shall conform to the requirements of the latest edition of the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro standards.

B. All materials for signs shall conform to the requirements of the latest edition of the North Carolina Department of Transportation (NCDOT) Standard Specifications for Roads and Structures (and to the requirements of the latest edition of the Manual of Uniform Traffic Control Devices for traffic signs and City of Greensboro standards.

C. Installer Qualifications: Engage an experienced installer, who has successfully completed striping and signage projects similar in size and complexity to this project. The installer's primary business (defined as a minimum of 60% of total billings) shall be striping and signage.

1.4 SUBMITTALS

A. Product Data and written confirmation that the following materials are included on NCDOT/City of Greensboro list of approved construction materials:

1. Pavement marking paint
2. Wheel stops
3. Signs
4. Posts

PART 2 - PRODUCTS

2.1 PAVEMENT MARKING PAINT

A. Paint shall conform to the requirements of Division 12 of the (NCDOT) Standard Specifications for Roads and Structures and Federal Specification TT-P-1952. Color shall be white unless otherwise indicated.

B. Thermoplastic lane markings are required within public rights-of-way.

2.2 PAINT APPLICATOR

A. Provide hand-operated push-type applicator machine of a type commonly used for application of paint to pavement surfaces. Paint applicator machine shall be acceptable for marking small street and parking areas. Applicator machine shall be equipped with the necessary paint tanks and spraying nozzles, and shall be capable of applying paint uniformly at coverage specified.

2.3 WHEEL STOPS

A. Wheel stops shall be made of 3,000 psi precast concrete and be 6 inches high, 8 inches wide and approximately 6 feet long. Provide chamfered corners and edges and two holes for anchoring.

2.4 SIGNS AND POSTS

A. Signs shall conform to the requirements of the (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro standards. Signs shall be fabricated with encapsulated lens sheeting.

B. Utilize metal posts for traffic control signage conforming to the requirements of the (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro standards.

C. Utilize metal posts for fire-lane signage and for signage at accessible parking spaces.

2.5 CONCRETE

A. Concrete shall be Class A, General concrete, conforming to the requirements of the (NCDOT) Standard Specifications for Roads and Structures City of Greensboro standards.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION FOR PAVEMENT MARKING

A. Apply pavement markings only when the ambient temperatures is above 50°F and less than 95°F, unless otherwise approved.

B. Allow pavement to cure for a period of not less than 7 days before applying pavement marking.

C. Clean surfaces thoroughly before application of paint. Remove, dust, dirt and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods as required.

D. Remove existing pavement markings, residual curing compounds and other coating adhering to the pavement with scrapers, wire brushes, waterblasting, sandblasting or mechanical abrasion as required. Areas of existing pavement affected by oil or grease shall be scrubbed with an approved chemical and rinsed thoroughly. Seal oil soaked areas with shellac or primer after cleaning.

E. Pavement surfaces shall be dry and clean prior to painting. Pavement markings shall not be applied within 24 hours following rain or other inclement weather or when rain is imminent.

3.2 APPLICATION OF PAVEMENT MARKING

A. Apply paint in accordance with the requirements of the (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro standards.

B. Lay out lines and markings to the width and length as indicated. All parking space lines shall be 4 inches wide.

C. Apply paint with an approved paint applicator.

D. Apply paint at manufacturer recommended rates to provide a minimum 15 mil wet thickness.

3.3 FIRE LANE MARKINGS AND SIGNAGE

A. Mark fire lanes and install fire lane signage in accordance with the requirements of the local Fire Marshall and as indicated on the drawings.

3.4 INSTALLATION OF WHEEL STOPS

A. Secure wheel stops with two 1/2-inch diameter steel reinforcing rods. Rods shall be a minimum of 18 inches in length and be embedded into the pavement, base and subgrade a minimum of 12 inches and be flush with the top of the bumper block.

3.5 INSTALLATION OF SIGNS

A. Install signs on signposts in accordance with the requirements of the (NCDOT) Standard Specifications for Roads and Structures and City of Greensboro standards.

B. Install signposts in concrete foundation to a depth of 3 feet minimum by 12 inches in diameter.

END OF SECTION 321700

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Work of this section is affected by an alternate, refer to Section 012300

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

1.2 SUMMARY

A. Section includes planting soils specified by composition of the mixes.

B. Related Requirements:
   1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
   2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
   3. Section 329300 "Plants" for placing planting soil for plantings.

1.3 EXTENT OF SOIL PREPARATION

A. As defined by plans the extent or limits of areas requiring soil preparation are all areas that are identified for seeding of lawn, seeding of no mow mix, sod, and plant beds. Not included are areas under pavement.

1.4 GENERAL CONTRACTOR’S RESPONSIBILITY

A. It is the general contractor’s responsibility to prepare those areas identified for specified soil preparation including the provision and installation of imported soil material as specified. Following installation and approval by Landscape Architect, soil will be sampled and tested for further amendments and fertilization by landscape contractor under separate contract.

1.5 LANDSCAPE CONTRACTOR’S RESPONSIBILITY

A. It will be the landscape contractor’s responsibility to test and amend the soil following the general contractor’s installation, adjusting soil per soil test’s recommendations, fine grade by raking, seeding, plant installation and mulching.

1.6 UNIT PRICES

A. Work of this Section is affected by unit prices specified in Section 012200 "Unit Prices."

1.7 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

F. Imported Soil: Soil that is transported to Project site for use.

G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.

H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

M. SSSA: Soil Science Society of America.

N. 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.

O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

Q. USCC: U.S. Composting Council.

1.8 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.9 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include recommendations for application and use.
2. Material Certificates: For imported soil before delivery to the site, according to the following:

    a. Manufacturer's qualified testing agency's certified analysis of standard products.
    b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
    c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.10 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

1.11 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.

1. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.12 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.

B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Landscape Architect under the direction of the testing agency.

1. Number and Location of Samples: Minimum of six representative soil samples from varied locations where directed by Landscape Architect for each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: Samples to be to a depth of 12”.

3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

C. Chemical Testing:

1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.

D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil per suggestions of soil analysis.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED BY COMPOSITION

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

B. Planting-Soil Type for all areas where lawn, plant beds, or now mow mix is designated on the plans: Contractor is responsible for importing a soil mix that consists of 1/3 compost, 1/3, manure, and 1/3 topsoil.

1. Unacceptable Properties: Clean soil of the following:

a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.

2.2 IMPORTED SOIL COMPONENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Reaction: pH of 5.5 to 8.
2. Soluble-Salt Concentration: Less than 4 dS/m.
3. Moisture Content: 35 to 55 percent by weight.
4. Organic-Matter Content: 100 percent of dry weight.
5. Particle Size: Minimum of 98 percent passing through a 1-inch sieve.

B. Topsoil: Soil with a pH of 5.8-6.2; of uniform texture and free of chips, stones, sticks, soil, or toxic materials. Particle size limited to 98% passing through 1/2 –inch sieve.

C. 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.

PART 3 - EXECUTION

3.1 GENERAL

A. Place imported planting soil according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

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

3.2 PLACING AND MIXING PLANTING SOIL WITH EXPOSED SUBGRADE

A. General: Apply and mix imported soil mix with on-site soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 8 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Spread imported soil mix to total depth of 6 inches, but not less than required to meet finish over tilled subgrade. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.

D. Compaction: Compact soil final condition to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.3 FIELD QUALITY CONTROL

A. Soil will be considered defective if it does not meet final grade elevations and is not smooth, consistent and free of extraneous materials or is not installed to required depths as determined by Landscape Architect.

3.4 PROTECTION

A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."

B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.5 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 329113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Work of this section is affected by an alternate, refer to Section 012300.
B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Seeding.
2. Sodding.
3. Turf renovation.

B. Related Sections include the following:

1. Division 01 General Requirements
2. Division 31 Earthwork.
3. Division 32 Exterior Improvements.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. 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.

D. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill immediately beneath planting soil.

E. Subsoil: All soil beneath the topsoil layer of the soil profile, typified by the lack of organic matter and soil organisms.

F. 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 surfaces oil can be subsoil.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, including planting soil.

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 and percentage by weight of each species and variety, and percentage of purity, germination, inert matter, noxious weeds by name & % per pound and weed seed. Include the year of production and date of packaging.

C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.

D. Qualification Data: For landscape Installer. Include key personnel background and list of similar projects, minimum 3 projects completed and 5 years of experience in turf installation by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

E. Material Test Reports: For existing surface soil and imported or manufactured topsoil.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer shall be a licensed Landscape Contractor. Only a landscape Contractor as defined by the General Statutes of North Carolina and licensed in North Carolina shall be permitted to perform this work. A copy of the Landscape Contractor's License or License Number shall be presented to the Owner's representative at the time the contract is executed

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
2. Personnel Certifications: Installer's field supervisor shall have certification with the Turfgrass Council of North Carolina
3. Pesticide Applicator: State licensed, commercial.

B. Soil-Testing Laboratory Qualifications: An independent 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: Furnish soil analysis 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. Based on the test results, state recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil.
2. 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.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Seed: Deliver seed in original sealed, labeled, and undamaged 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 Turfgrass Producers International's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding." or other

approved professional organization such as North Carolina State University's Turf Files or Clemson University. 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, discharged 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 COORDINATION

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion. Variation in schedule shall be pre-approved by Owner.

1. Temporary Seeding Schedule:

Date	Type	Min.Application Rate
Sept. 15 – Mar. 30	Tall Fescue and	250 lbs/acre
	Winter Rye	50 lbs/acre
Apr. 1 – Sept. 15	Tall Fescue and	250 lbs/acre
	German Millet or	25 lbs/acre
	Sudangrass (small-stemmed var.)	30 lbs/acre

2. Permanent Seeding Schedule – Turf Areas

Date	Type	Min.Application Rate
Sept. 1 – Oct 15	Turf Type Tall Fescue	350 lbs/acre
Sept. 1 – Oct 15	Turf Type Tall Fescue	sod

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.8 MAINTENANCE SERVICE

A. Provide complete 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 or naturalized grass, including meadow and no-mow grasses, is established, for not less than 12 months from Substantial Completion, or as directed by Owner.
B. Maintenance Service: Submit to Owner on first day of month Maintenance Report Form (provided) showing weekly maintenance completed. Owner shall verify and sign off on Maintenance Report Form prior to maintenance payment.

1.9 SATISFACTORY TURF AND GRASSES

A. Installer shall repair or replace turf or naturalized grass, including meadow and no-mow grass, and accessories that fail in materials, workmanship, or growth within 12 months from Substantial Completion. Turf and naturalized grass installation shall meet the following criteria as determined by Architect:

B. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 6 by 6 inches.

C. 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.

D. Satisfactory Naturalized Grass, including meadow and no-mow grasses: At end of maintenance period, a healthy stand of naturalized grass has been established, free of weeds, with coverage exceeding 90 percent over any 100 sq. ft. area.

E. Renovate, reseed or replace unsatisfactory turf or naturalized grass, as required in Part 3, at end of 12-month maintenance period.

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: 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:

1. Permanent seeding: Turf Type Tall Fescue

2. Temporary seeding: Tall Fescue and Winter Rye
   Tall Fescue and, German Millet or Sudangrass

2.2 TURFGRASS SOD

A. Turfgrass Sod: Certified complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed

1. Turf Type Tall Fescue

2.3 PLANTING SOILS

A. Planting soil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 20 percent organic material content; free of stones 1/2 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. See Soil Preparation Specification

2.4 PLANTING ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.5 FERTILIZER

A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 20 percent phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

C. Slow-Release Fertilizer: Granular or pelletized fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
2. Fish-emulsion, compost tea.

D. Other Organic Fertilizer: Contractor is encouraged to utilize other organic fertilizer with a lower nitrogen value, such as worm castings, sewage sludge. Contractor shall submit product information for Architect’s approval prior to application.

2.6 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 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.

C. Non-asphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; non-toxic and free of plant-growth or germination inhibitors.

D. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.7 PESTICIDES AND HERBICIDES

A. Pesticides: 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: 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: Effective for controlling weed growth that has already germinated.

2.8 EROSION-CONTROL MATERIALS

A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples.

B. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 lb/sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive turf and grass for compliance with requirements and other conditions affecting performance. Grade strictly according to the proposed grading plan. Proceed with installation only after Owner approves the subgrade and unsatisfactory conditions have been corrected.

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 overspray.

B. 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.

3.3 TURF PREPARATION

A. Limit turf subgrade preparation to areas to be planted.

B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 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. Thoroughly blend planting soil mix before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.

    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.

2. Spread planting soil mix 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 one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
    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 6-12 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.
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 fine grading to areas that can be planted in the immediate future.

E. Moisten prepared turf areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 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.

B. Sow seed at the rate recommended by seed manufacturer and as required to achieve 95% coverage over any 10 sq. ft.

C. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes exceeding 1:6 with erosion-control fiber mesh and 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.

E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into topsoil with suitable mechanical equipment; Or
2. Bond straw mulch by spraying with asphalt emulsion at the 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.

F. Protect seeded areas from hot, dry weather or drying winds by applying peat or compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 1/4 inch and roll to a smooth surface. Water daily or more frequently as necessary to maintain moist soil to a minimum depth of 2 inches.

3.5 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 a tackifier.
2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

3.6 SODDING

A. Remove plastic netting or backing from sod.

B. Lay sod within 24 hours of harvesting. Do not lay sod if dormant, unless overseeded, or if ground is frozen or muddy.

C. 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.

D. Saturate sod with fine water spray within two hours of planting. Water daily or more frequently as necessary to maintain moist soil to a minimum depth of 2 inches below sod.

3.7 TURF RENOVATION

A. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.

1. Reestablish turf where settlement or washouts occur or where minor regrading is required.

B. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.

C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.

D. Mow, dethatch, core aerate, and rake existing turf.

E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.

G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.

H. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.

I. Apply seed and protect with straw mulch as required for new turf.

J. Water newly planted areas and keep moist until new turf is established.

3.8 TURF MAINTENANCE

A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, top-dress and replant bare or eroded areas and remulch to produce a uniformly smooth turf.

1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.

B. Watering: Provide 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 comply with the latest City of Raleigh Water Conservation Ordinance.
2. 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.
3. Water turf at a minimum rate of 1 inch per week and document on Maintenance Report Form.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 33 percent of grass height. Remove no more than 33 percent 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.

D. When seeding must take place out-of-season for permanent grass, appropriate temporary seeding shall be done and the contractor shall be responsible for permanent seeding as specified in season at no additional cost to Owner. Do not allow temporary cover to grow over 12 inches in height before mowing.

3.9 PESTICIDE AND HERBICIDE APPLICATION

A. Apply pesticides and other chemical projects and biological control agents in accordance with requirements of authorities having jurisdiction and the product label. Coordinate applications with owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Post-Emergent Herbicide: Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.10 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required protecting newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after turf is established.

C. Remove erosion-control measures after grass establishment period.

END OF SECTION 329200

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Work of this section is affected by an alternate, refer to Section 012300.

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

1.2 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Tree-watering devices.

B. Related Requirements:

1. Section 015639 "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
2. Section 329200 "Turf and Grasses" for turf (lawn) and meadow planting, hydroseeding, and erosion-control materials.
3. Section 329113 “Soil Preparation”

1.3 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than sizes indicated; 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 sizes indicated.

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 the 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. 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.

G. Finish Grade: Elevation of finished surface of planting soil.

H. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.

I. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

J. Planting Area: Areas to be planted.

K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 329113 "Soil Preparation" for drawing designations for planting soils.

L. 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.

M. 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.

N. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.

O. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of three photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:
1. Organic Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
2. Weed Control Barrier: 12 by 12 inches.
3. Proprietary Root-Ball-Stabilization Device: One unit.
4. Edging Materials and Accessories: Manufacturer's standard size, to verify color selected.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:

1. Manufacturer's certified analysis of standard products.
2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

D. Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful establishment of plants.

1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: Five years' experience in landscape installation in addition to requirements in Section 014000 "Quality Requirements."
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:

    a. Landscape Industry Certified Technician - Exterior.
    b. Landscape Industry Certified Interior.
    c. Landscape Industry Certified Horticultural Technician.

5. Pesticide Applicator: State licensed, commercial.

B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

1. Selection of plants purchased under allowances is made by Architect, who tags plants at their place of growth before they are prepared for transplanting.

C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.

1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.

D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Architect of sources of planting materials ten days in advance of delivery to site.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. 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.

G. 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.

H. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1. Heel-in bare-root stock. Soak roots that are in less than moist condition in water for two hours. Reject plants with dry roots.
2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
3. Do not remove container-grown stock from containers before time of planting.
4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Tree & Shrub Planting: October 15- March 15.
2. Ornamental Grasses: May 15 – August 15.

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization and edgings.
d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Periods: From date of Substantial Completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots are unacceptable.
2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label 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.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting. This is particularly important of plant material at the front of the building. Material that is not uniform in height, spread, and form will be rejected and the contractor will be responsible for finding acceptable replacement material.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 5-gram or 10-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood in all plant bed areas. Pine straw in areas noted on plans.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural.

2.4 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as

required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.5 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Wood Deadmen: Timbers measuring 8 inches in diameter and 48 inches long, treated with specified wood pressure-preservative treatment.
3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or 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. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.

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 (38-by-38-mm actual) by length indicated; stakes pointed at one end.

2.6 MISCELLANEOUS PRODUCTS

A. Wood Pressure-Preservative Treatment: AWPA U1, Use Category UC4a; acceptable to authorities having jurisdiction, and containing no arsenic or chromium.

B. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.

C. Burlap: Non-synthetic, biodegradable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

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

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 329113 "Soil Preparation."

B. Placing Planting Soil: Place manufactured planting soil over exposed subgrade .

C. Before planting, obtain Landscape Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not

further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

2. Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

1. Hardpan Layer: Drill 6-inch- diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.

1. Backfill: Planting soil for trees, use excavated 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 equally distributed around each planting pit when pit is approximately one-half filled. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.

    a. Quantity: As indicated by manufacturer's recommendations.

5. Continue backfilling process. Water again after placing and tamping final layer of soil.

6. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE-SPADE PLANTING

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.

C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

D. Cut exposed roots cleanly during transplanting operations.

E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape.

B. Prune, thin, and shape trees, shrubs, and vines as directed by Architect.

C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.

D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

A. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.

1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

    a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses. Provide turnbuckle or compression spring for each guy wire and tighten securely.
    b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle or compression spring. Allow enough slack to avoid rigid restraint of tree.
    c. Attach flags to each guy wire, 30 inches above finish grade.

2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees and shrubs as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil as noted in Soil Planting for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that minimally disturbs the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.
1. Trees in Turf Areas: Apply organic mulch ring of 4-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.

3.11 INSTALLING SLOW-RELEASE WATERING DEVICE

A. Provide one device for each tree.

B. Place device on top of the mulch at base of tree stem and fill with water according to manufacturer's written instructions.

3.12 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.

B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.13 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.

C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.14 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Landscape Architect determines are incapable of restoring to normal growth pattern.

1. Provide new trees of same size as those being replaced for each tree
2. Species of Replacement Trees: Same species being replaced.

3.15 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.16 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:

1. Maintenance Period: 12 months from date of Substantial Completion.

END OF SECTION 329300

SECTION 331000 - EXTERIOR WATER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

B. City of Greensboro standards and specifications (most recent edition).

1.2 SUMMARY

A. This section includes water service piping, fire protection service mains and appurtenances from the source of water to a point 5 feet outside the building.

1.3 SUBMITTALS

A. Product data for piping, valves, vaults, fire hydrants, and identification devices.

1.4 QUALITY ASSURANCE

A. Comply with local utility department and fire department standards pertaining to materials, meter boxes, hose threads and installation.

B. Comply with the requirements of the latest edition of the City of Greensboro standards and specifications.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: All transportation of materials shall be in accordance with City of Greensboro requirements.

B. Storage: All storage of materials shall be in accordance with City of Greensboro requirements.

C. Handling: All handling of materials shall be in accordance with City of Greensboro requirements.

D. All materials shall be delivered in accordance with City of Greensboro requirements.

E. All materials shall be protected in accordance with City of Greensboro requirements.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site surveys, research public utility records, and verify existing utility locations. Verify that exterior water system may be installed in compliance with the original design and referenced standards. Notify Architect immediately of any discrepancies.

B. Coordinate connection to the existing water service with the City of Greensboro.

C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner of others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.

1. Notify Architect not less than 48 hours in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without receiving Architect's written permission.

3. Existing utilities across or along the line of work are indicated only in an approximate location. Locate all underground lines and structures. Call "NC ONE CALL" at 1-800-632-4949 prior to construction. If utilities are marked that are not shown on the plans, locate utility vertically and horizontally and provide information to architect. Repair and correct any damage to underground lines and structures.

D. Connections to Existing System:

1. Before the start of the construction, the Contractor shall dig test pits on all crossings of and connections to the existing system, as applicable, to determine the existing system location, size, and piping material. If the location, size, and piping material differs from that shown on the Drawings, notify Architect immediately.

2. The Contractor shall make connections to the existing system under a pressure or non-pressure condition, as indicated, complying with the system owner's requirements for the time of day such work can be done. The Contractor shall pay all costs associated with the connections unless otherwise indicated. If the system owner performs the work, the Contractor shall arrange for the work to be done.

3. Valves are to be operated only by the Owner or with the Owner's written permission.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate with interior water piping and interior fire protection piping.

B. Coordinate with other utility work.

C. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Architect not less than two days in advance of the proposed interruption.

2. Do not proceed with the interruption without Architects written permission.

3. Provide temporary utility service to the facility.

4. Valves are to be operated only by the Owner or with the Owner's written permission.

PART 2 - PRODUCTS

2.1 GENERAL

A. All piping, valves, fittings, fire hydrants, meters, meter vaults, appurtenances and other products shall conform to the requirements of the latest edition of the City of Greensboro standards and specifications.

2.2 Detectable Marking Tape

A. All underground utility lines outside building footprint, except lawn irrigation lines, shall be required to have a warning tape installed in the backfill between 6" and 24" below finished grade directly over piping.

1. Metallica lines shall be identified with durable printed plastic warning tapes, minimum 3" wide with lettering to identify buried line below.

2. Non-metallic pipes shall be identified by detectable warning tape, minimum 2" wide, with lettering to identify buried line below.

B. Plastic marking tape shall consist of one layer of aluminum foil laminated between two layers of inert plastic film. Tape shall be resistant to alkalis, acids, and other destructive agents commonly found in the soil. The laminate shall be strong enough that the layers cannot be separated by hand.

C. Tape shall be minimum of 4-1/2 mils think with minimum tensile strength of 60 lbs in the machine direction and 58 lbs in the transverse direction per 3" wide strip. Tape color shall be APWA Color Coded for marking the particular utility and shall be imprinted with a continuous warning message to indicate the type of utility being marked, the message normally being repeated every 16" to 36". Tape shall be inductively locatable and conductively traceable using a standard pipe and cable-locating device. Tape shall be 3" wide Terra Tap "Sentry Line Detectable 620," or approved equivalent.

2.3 Tracing Wire

A. Tracing Wire shall be installed on all non-metallic waterline (including all service laterals)

B. Wire shall be No. 12, stranded, type THHN, thermoplastic insulated and nylon jacketed. Wire shall be color coded blue for water.

C. Acceptable Wire Connectors:

1. Set screw pressure type for use with No. 12 standard wire size. Holub Industries MA-2, Ideal Industries Model 30-222, or approved equal.

2. C-Tap for two way splicing of tracer wire, for use with No. 12 stranded wire size. T&B #54705 or approved equal.

3. Split bolts, three wire type for splicing of tracer wire, for use with No. 12 stranded wire size ILSCO Catalog #SEL-2S or approved equal

D. Electric Tape – Vinyl electric tape

E. Electrical Coating – Scotchkote 3M electrical coating Part No. 054007 or approved equal.

F. Wire Nut – non-conductive for No. 12 stranded wire size.

PART 3 - EXECUTION

3.1 GENERAL

A. Installation of the exterior water system shall comply with the requirements of the latest edition of the City of Greensboro standards and specifications.

3.2 PREPARATION OF BURIED PIPE FOUNDATION

A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.

C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.3 PIPE AND PIPE FITTINGS INSTALLATION

A. Depth of Cover: Provide minimum cover over piping of 18 inches below average local frost depth or 36 inches below finished grade, whichever is greater.

B. Water Service Termination: Terminate water service piping 5'-0" from building foundation in location and invert as indicated. Coordinate location with interior water piping and interior fire service piping. Provide temporary pipe plug for piping extension into building.

3.4 FIELD QUALITY CONTROL

A. Testing and Disinfection: Disinfect, flush and test in accordance with the requirements of the latest edition of the City of Greensboro.

END OF SECTION 331000

SECTION 333000 - SANITARY SEWERAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

B. City of Greensboro standards and specifications.

1.2 SUMMARY

A. This Section includes sanitary sewerage system piping and appurtenances from a point 5 feet outside the building to the point of disposal.

1.3 SUBMITTALS

A. Product data for sewer piping specialties.

B. Shop drawings for precast concrete sanitary manholes, including frames and covers.

C. Shop drawings for cast-in-place concrete or field-erected masonry sanitary manholes, including frames and covers.

D. Inspection and test reports specified in the "Field Quality Control" Article.

1.4 QUALITY ASSURANCE

A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to sanitary sewerage systems, and to the requirements of the North Carolina Erosion and Sediment Control Handbook for erosion control during installation.

B. Utility Compliance: Comply with the requirements of the City of Greensboro.

1.5 DELIVERY, STORAGE, AND HANDLING

A. All materalials shall be delivered in accorandance with the requirements of the City of Greensboro.

B. All storage of materials shall be in accordance with the requirements of the City of Greensboro.

C. All materials shall be protected in accordance with the requirements of the City of Greensboro.

D. All handling of materials shall be in accordance with the requirements of the City of Greensboro.

1.6 PROJECT CONDITIONS

A. Site Information: Perform site surveys, research public utility records, and verify existing utility locations. Verify that sanitary sewerage system piping may be installed in compliance with original design and referenced standards.

B. Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: The location of existing utilities, including underground utilities, is indicated on the drawings insofar as their existance and location were known at the time of preparation of the drawings. However, nothing in these Contract Documents shall be constructed as a guarantee that such utilities are in the location idicated or that they actually exist, or that other utilities are not within the area of operations. The Contractor shall make all necessary investigations to determine the existance and locations of such utilities far enough in advance of pipelaying to allow for adjustments due to conflicts in the horizontal and vertical positions of the pipeline.

1. Do not proceed with utilitly interruptions without receiving Architect's written permission.

2. Notify Architect not less than 48 hours in advance of proposed utiltity interruptions.

3. Existing utilities across or along the line of work are indicated only in an appoximate location. Locate all undergound lines and structures. Call " NC ONE Call at 1-800-632-4949 prior to construction. If utilities are marked that are not shown on the plans, locate utility vertically and horizontally and provide information to architect.

D. Connections to existing system:

1. Before the start of the construction, the Contractor shall dig test pits on all crossings of and connections to the existing system, as applicable, to determine the existing system location, size, and piping material. If the location, size, and piping material differs from that shown on the Drawings, notify Architect immediately.

2. The Contractor shall make connections to the existing system under a pressure or non-pressure condition, as indicated, complying with the system owner's requirements for the time of day such work can be done. The Contractor shall pay all costs associated with the connections unless otherwise indicated. If the system owner performs the work, the Contractor shall arrange for the work to be done.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate with interior building sanitary drainage piping.

B. Coordinate with other utility work.

C. Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted under the following conditions.

1. Notify the Architect not less than two days in advance of the proposed interruption.

2. Do not proceed with the interruption without Architect's written permission.

3. Provide temporary utility service to existing facilities if required by the Owner.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. General: Provide pipe and pipe fitting materials compatible with each other. All materials shall comply with the requirements of the latest edition of the City of Greensboro Standards and Specifications.

2.2 MANHOLES

A. Precast Concrete Manholes: Shall comply with the latest edition of the City of Greensboro Standards.

B. Manhole Steps shall comply with the latest edition of the City of Greensboro Standards.

C. Manhole Frames and Covers: Shall comply with the latest edition of the City of Greensboro Standards.

2.3 CLEANOUTS

A. General: Provide cast-iron ferrule and countersunk brass cleanout plug, with round cast-iron access frame and heavy-duty, secured, scoriated cast-iron cover.

B. Sewer pipe fitting and riser to cleanout: 4" dia. ductile iron pipe.

2.4 Detectable Marking Tape

A. All underground utility lines outside building footprint, except lawn irrigation lines, shall be required to have a warning tape installed in the backfill between 6” and 24” below finished grade directly over piping.

1. Metallica lines shall be identified with durable printed plastic warning tapes, minimum 3” wide with lettering to identify buried line below.

2. Non-metallic pipes shall be identified by detectable warning tape, minimum 2” wide, with lettering to identify buried line below.

B. Plastic marking tape shall consist of one layer of aluminum foil laminated between two layers of inert plastic film. Tape shall be resistant to alkalis, acids, and other destructive agents commonly found in the soil. The laminate shall be strong enough that the layers cannot be separated by hand.

C. Tape shall be minimum of 4-1/2 mils think with minimum tensile strength of 60 lbs in the machine direction and 58 lbs in the transverse direction per 3” wide strip. Tape color shall be APWA Color Coded for marking the particular utility and shall be imprinted with a continuous warning message to indicate the type of utility being marked, the message normally being repeated every 16” to 36”. Tape shall be inductively locatable and conductively traceable using a standard pipe and cable-locating device. Tape shall be 3” wide Terra Tap “Sentry Line Detectable 620,” or approved equivalent.

PART 3 – EXECUTION

3.1 GENERAL

A. Installment of all sewer features shall conform to the latest requirements of the City of Greensboro.

3.2 FIELD QUALITY CONTROL

A. Clean, inspect, and test in accordance with the latest requirements of the City of Greensboro.

END OF SECTION 333000

SECTION 334100 - STORM DRAINAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY:

A. This Section includes the roof drainage collection system, the storm sewerage system piping and appurtenances from a point 5 feet outside the building to the point of disposal.

1.3 SUBMITTALS

A. Product data for:

1. Concrete pipe
2. Polyethylene pipe
3. Ductile Iron Pipe
4. Frames and covers.
5. Grates
6. Drainage Structures

B. Certification, signed by material producer and contractor, that standard precast and cast in place concrete storm drainage manholes and drop inlets comply with City of Greensboro standards and specifications.

C. NCDOT approved job mix for bedding stone.

D. Shop drawings for:

1. Non-standard precast or cast-in-place concrete storm drainage manholes and drop inlets.
2. Cleanouts
3. Storm piping

E. Record drawings of installed storm drainage system.

1.4 QUALITY ASSURANCE

A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to storm sewerage systems.

B. Utility Compliance: Comply with state and local regulations and standards pertaining to storm sewerage systems.

C. All materials shall be new and free of defects (i.e. pipe shall not have chipped spigots or bells).

1.5 PROJECT CONDITIONS

A. Site Information: Perform site surveys, research public utility records, and verify existing utility locations. Verify that storm sewerage system piping may be installed in compliance with original design and referenced standards.

B. Locate existing structures and piping to be closed and abandoned.

C. Existing Utilities: Do not interrupt existing storm sewer serving facilities occupied by the Owner of others except when permitted under the following conditions and then only after arranging to provide acceptable temporary storm sewer services.

1. Notify Architect not less than 48 hours in advance of proposed storm sewer interruptions.

2. Do not proceed with storm sewer interruptions without receiving Architect's written permission.

D. Existing utilities across or along the line of work are indicated only in an approximate location. Locate all underground lines and structures. Call "NC one call" at 1-800-632-4949 prior to construction. If utilities are marked that are not shown on the plans, locate utility vertically and horizontally and provide information to architect.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate with interior building storm drainage piping and foundation drainage.

B. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials used for construction of the storm sewerage system shall comply with the requirements of the City of Greensboro.

2.2 PIPE AND FITTINGS

A. Provide pipe and pipe fitting materials compatible with each other. Pipe materials are indicated on the drawings.

B. Reinforced Concrete Pipe (RCP): Shall conform to the requirements of ASTM C76/AASHTO M170, Class III, unless otherwise indicated.

C. O-Ring Gasket Reinforced Concrete Pipe: Shall conform to the requirements of ASTM C76/AASHTO M170, Class III, unless otherwise indicated. Joints shall conform to the requirements of ASTM C443/AASHTO M198.

D. Corrugated Polyethylene Pipe (P.E.): Shall have a smooth lined interior and meet the requirements of ASTM F405 or AASHTO M252 for 10" diameter and smaller, and ASTM F667 or AASHTO M294 for 12" diameter and larger.

E. PVC Storm Sewer Pipe: Shall conform to the requirements of ASTM D3034, SDR-35 with bell and spigot ends for gasketed joints with ASTM F 477 elastometric seals

a) Connections to the building downspouts shall be made with Schedule 40 PVC.

F. Ductile Iron Storm Sewer Pipe: Shall conform to the requirements of AWWA C151, Class 52. Flanged joints shall conform to the requirements of AWWA C115.

2.3 MANHOLES

A. Precast Concrete Manholes: Comply with the requirements of the City of Greensboro.

B. Cast-in-Place Manholes: Comply with the requirements of the City of Greensboro.

C. Manhole Steps, Safety Slabs and Inlet Shaping: Comply with the City of Greensboro.

D. Manhole Frames and Covers: Comply with the requirements of the City of Greensboro.

2.4 CLEANOUTS

A. Cast-iron ferrule and countersunk brass cleanout plug, with round cast-iron access frame and heavy-duty, secured, scoriated cast-iron cover.

2.5 CATCH BASINS & DROP INLETS

A. Precast Concrete Catch Basins & Drop Inlets: Comply with the requirements of the City of Greensboro.

B. Cast-in-Place Catch Basins & Drop Inlets: Comply with the requirements the City of Greensboro.

C. Catch Basin & Drop Inlet Steps, Safety Slabs and Inlet Shaping: Comply with the requirements of the City of Greensboro.

D. Catch Basin & Drop Inlet Frames and Grates: Comply with the requirements of the City of Greensboro.

E. PVC Drain Basins & Junction Boxes: H-20 rated w/ heel proof grate required in hardscape areas

H-10 rated w/ mulch proof grate required in landscape areas

2.6 CONCRETE AND REINFORCEMENT

A. Concrete: Conform to the requirements of NCDOT Standard Class B concrete.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185 welded wire fabric, plain.

2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

PART 3 - EXECUTION

3.1 GENERAL

A. Install the storm sewerage system in accordance with the City of Greensboro.

3.2 PREPARATION OF FOUNDATION FOR BURIED STORM SEWERAGE SYSTEMS

A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.

C. Install pipe bedding conforming to the requirements of the City of Greensboro.

3.3 PIPE INSTALLATION

A. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

B. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

C. Extend storm sewerage system piping to connect to building storm drains, of sizes and in locations indicated.

D. Join and install concrete pipe and fittings per City of Greensboro specifications.

E. Join and install PE pipe and fittings per manufacturer’s recommendations.

F. Join different types of pipe with standard manufactured couplings and fittings intended for that purpose.

3.4 MANHOLES

A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish grade, unless otherwise indicated.

B. Place precast concrete manhole sections as indicated, and install in accordance with ASTM C 891.

C. Construct cast-in-place manholes as indicated.

D. Apply bituminous mastic coating at joints of sections.

3.5 CLEANOUTS

A. Install cleanouts and extension from sewer pipe to cleanout at grade as indicated. Set cleanout frame and cover in concrete block 12 by 12 by 6 inches deep, except where location is in concrete paving. Set top of cleanout flush with finish grade.

3.6 CATCH BASINS & DROP INLETS

A. Construct catch basins & drop inlets to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.7 INLET SHAPING

A. Construct inlet shaping conforming to City of Greensboro standards at all drop inlets and manholes.

3.8 FIELD QUALITY CONTROL

A. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.

1. In large, accessible piping, brushes and brooms may be used for cleaning.
2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
3. Flush piping between manholes and drop inlets to remove collected debris. Flush pipes through an approved erosion and sediment control measure.

B. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.
2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects correct such defects and reinspect.

END OF SECTION 334100

SECTION 334613 - FOUNDATION DRAINAGE SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract Documents apply to the work of this Section.

1.2 SUMMARY

A. This Section includes underground foundation drainage systems, as follows:

1. Footing drainage system.
2. Elevator pit drainage system

1.3 SUBMITTALS

A. Product data for each type of foundation drainage material required.

B. Shop drawings for interfacing with total site drainage system.

C. Certification signed by Contractor and foundation drainage system Installer that installed materials conform to requirements and system was successfully checked and tested prior to covering with filter fabric and drainage fill.

PART 2 - PRODUCTS

2.1 DRAINAGE PIPE AND FITTINGS

A. Provide drainage pipes complete with bends, reducers, adapters, couplings, collars, and joint materials.

1. Perforated Polyvinyl Chloride Pipe: ASTM D 2729.
2. Perforated Polyethylene Pipe: ASTM F405.

2.2 SOIL & MISCELLANEOUS MATERIALS

A. General: Bedding, backfill, and porous fill materials are indicated in Section 31 2000, Earthwork.

B. Filter Fabric: Manufacturer’s standard non-woven geotextile fabric of polypropylene or polyester fibers, or a combination thereof.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine adjacent surfaces to receive foundation drainage system to verify suitability. Do not begin installation until subsurface conditions are satisfactory to accept drainage system.

3.2 INSTALLATION

A. Inspect pipe trench for line, level (or slope as required) and pipe support conditions.

B. Laying Drain Pipe: Lay drain pipe solidly bedded. Provide full bearing for each pipe section throughout its length to true grades and alignment, and continuos slope in direction of flow.

1. Lay perforated pipe with perforations down and joints tightly closed in accordance with pipe manufacturer's recommendations. Provide collars and couplings as required.

2. Provide recesses in excavation bottom to receive bells for drain pipe having bell and spigot ends. Lay pipe with bells facing up slope and with spigot end entered fully into adjacent bell. Seal joint in accordance with requirements of local building official.

C. Testing Drain Lines: Test and check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

D. Drainage Fill: Place drainage fill (material indicated in Section 02300) over drain lines after satisfactory testing. Completely cover drain lines to a width of at least 6 inches on each side and above top of pipe to within 12 inches of finish grade. Place fill material in layers not exceeding 3 inches in loose depth and compact each layer placed.

1. Overlay drainage fill material with one layer of filter fabric, overlapping edges at least 4 inches.

E. Fill to Grade: Install fill material over compacted drainage fill at footing drains, placing material in layers not exceeding 6 inches in loose depth and thoroughly compacting each layer, as indicated in Section 312000.

END OF SECTION 334613

Contractor's and/or Mortgagor's Cost Breakdown
Schedule of Values

U.S. Department of Housing and Urban Development
Office of Housing
Federal Housing Commissioner

OMB No. 2502-0044 (exp. 12/31/2018)

EXHIBIT A

Public reporting burden for this collection of information is estimated to average 4 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. This information is required to obtain benefits. HUD may not collect this information, and you are not required to complete this form, unless it displays a currently valid OMB Control Number.

Section 227 of the National Housing Act (Section 126 of the Housing Act of 1954, Public Law 560, 12 U.S.C., 1715r), authorizes the collection of this information. The information is required for a general contractor when an identity of interest exists between the general contractor and the mortgagor or when the mortgagor is a nonprofit entity and a cost plus contract has been used. The information is used by HUD to facilitate the advances of mortgage proceeds and their monitoring.

Privacy Act Notice. The United States Department of Housing and Urban Development, Federal Housing Administration, is authorized to solicit the information requested in this form by virtue of Title 12, United States Code, Section 1701 et seq., and regulations promulgated thereunder at Title 12, Code of Federal Regulations. While no assurances of confidentiality is pledged to respondents, HUD generally discloses this data only in response to a Freedom of Information request.

Date: **December 28, 2024**

Sponsor: **GREENSBORO HOUSING AUTHORITY**

Project Number: **TBD**

Building Identification: **Site Infrastructure Roadways & Utilities**

Name of Project: **The Arbors at South Crossing**

Location: **West Florida Street, Greensboro, NC**

This form represents the Contractors and / or Mortgagors firm costs and services as a basis for disbursing dollar amounts when insured advances are requested. Detailed instructions for completing this form are included on the reverse side.

Line	Div.		Trade Item	Cost	Trade Description
1	3		Concrete	0.00	
2	4		Masonry	0.00	
3	5		Metals	0.00	
4	6		Rough Carpentry	0.00	
5	6		Finish Carpentry	0.00	
6	7		Waterproofing	0.00	
7	7		Insulation	0.00	
8	7		Roofing	0.00	
9	7		Sheet Metal	0.00	
10	8		Doors	0.00	
11	8		Windows	0.00	
12	8		Glass	0.00	
13	9		Lath and Plaster	0.00	
14	9		Drywall	0.00	
15	9		Tile Work	0.00	
16	9		Acoustical	0.00	
17	9		Wood Flooring	0.00	
18	9		Resilient Flooring	0.00	
19	9		Painting and Decorating	0.00	
20	10		Specialties	0.00	
21	11		Special Equipment	0.00	
22	11		Cabinets	0.00	
23	11		Appliances	0.00	
24	12		Blinds, Shades and Artwork	0.00	
25	12		Carpets	0.00	
26	13		Special Construction	0.00	
27	14		Elevators	0.00	
28	15		Plumbing and Hot Water	0.00	
29	15		Fire Sprinkler	0.00	
30	15		HVAC	0.00	
31	16		Electrical	0.00	
32			**Subtotal (Structures)**	**0.00**	
33			Accessory Structures	0.00	
34			**Total (Lines 32 and 33)**	**0.00**	

Line	Div.		Trade Item	Cost	Trade Description			
35	2		Earthwork	1,084,243.00	SEC, GRADING.			
36	2		Site Utilities	2,460,012.00	STORM PIPING, SANITARY SEWER, WATER MAINS & FHs.			
37	2		Roads and Walks	954,690.00	ASPHALT PAVING, CURB & GUTTER, SIDEWALKS.			
38	2		Site Improvement	363,230.00	FENCING, RETAINING WALLS.			
39	2		Lawns and Planting	185,000.00	STREET TREES AND SEEDING			
40	2		Unusual Site Condition	0.00	Nonresidential and Special			
41			**Total Land Improvements**	**5,047,175.00**	Exterior Land Improvement		Off site Costs	
42			**Total Struct. & Land Imprvmts.**	**5,047,175.00**	(costs included in trade item breakdown)		(costs not in trade item breakdown)	
	1		General Requirements	498,057.00	Description	Est. Cost	Description	Est. Cost
44			**Subtotal (Lines 42 and 43)**	**5,545,232.00**				
45			Builder's Overhead	110,905.00				
46			Builder's Profit	**277,262.00**				
47			**Subtotal (Lines 44 thru 46)**	**5,933,399.00**	**Total $**			
48					**Other Fees**		**Total $**	
49			Other Fees	57,454.00	Cost Certification	7,500.00	Demolition	
50			Bond Premium	35,234.00	Builder's Risk Ins.	25,000.00	(costs not in trade item breakdown)	
51			**Total for All Improvements**	**6,026,087.00**	General Liability	24,954.00	Description	Est. Cost
52			Builder's Profit paid by means	0.00		-		
			other than cash			-		
53			**Total for All Improvements**	**$ 6,026,087.00**	**Total $**	57,454.00	**Total $**	
			Less Line 52					

I hereby certify that all the information stated herein, as well as any information provided in the accompaniment herewith, is true and accurate.
Warning HUD will prosecute false claims and statements. Conviction may result in criminal and /or civil penalties. (18 U.S.C. 1001, 1010, 1012, 31 U.S.C. 3729, 3802)

Mortgagor: **GREENSBORO HOUSING AUTHORITY**	By:		Date:
Contractor: **Hamel Builders, Inc. and C2 Contractors, LLC**	By: Oscar Maccio, Executive Vice President		Date:
FHA: (Processing Analyst)	Date:	FHA: (Chief, Cost Branch or Cost Analyst)	Date:
FHA: (Chief Underwriter)			Date:

Instructions for Completing Form HUD-2328

This form is prepared by the Contractor and/or Mortgagor as a requirement for the issuance of a firm commitment. The firm replacement cost of the project also serves as a basis for the disbursement of dollar amounts when issued advances are requested. A detailed breakdown of trade items is provided along with spaces to enter dollar amounts and trade descriptions.

A separate form is prepared through line 32 for each structure type. A summation of these structure costs are entered on line 32 of a master form. Land improvements, General Requirements and Fees are completed through line 53 on the master 2328 only.

Date - Date form was prepared.

Sponsor - Name of sponsor or sponsoring organization.

Project Number - Eight digit assigned project number.

Building Identification - Number(s) or Letter(s) of each building as designated on plans.

Name of Project - Sponsor's designated name of project.

Location - Street address, city and state.

Division - Division numbers and trade items have been developed from the cost accounting section of the uniform system.

Accessory Structures - This item reflects structures, such as: community, storage, maintenance, mechanical, laundry, and project office buildings. Also included are garages and carports or other buildings.
When the amount shown on line 33 is $20,000.00 or 2% of line 32 whichever is the lesser, a separate form HUD-2328 will be prepared through line for Accessory Structures.

Other Fees - Includable are fees to be paid by the Contractor, such as sewer tap fees not included in the plumbing contract. Fees paid or to be paid by the Mortgagor are not to be included on this form.

Total for All Improvements - This is the sum of lines 1 through 50 and is to include the total builder's profit (line 46).

Line 52 - When applicable, enter that portion of the builder's profit (line 46) to be paid by means other than cash and/or any part of the builder's profit to be waived during construction.

Non-Residential and Special Exterior Land Improvement Costs - Describe and enter the cost of each improvement, i.e. on site parking facilities including individual garages and carports, commercial facilities, swimming pools with related facilities and on-site features provided to enhance the environment and livability of the project and the neighborhood. The Design Representative and Cost Analyst shall collaborate with the Mortgagor or his representative in designating the items to be included.

Off-Site Costs - Enter description and dollar amount including fees and bond premium for off-site improvements.

Unusual Site Conditions - This trade item reflects rock excavation, high water table, excessive cut and fill, retaining walls, erosion, poor drainage and other on-site conditions considered unusual.

Cost - Enter the cost being submitted by the Contractor or bids submitted by a qualified subcontractor for each trade item. These costs will include, as a minimum, prevailing wage rates as determined by the Secretary of Labor.

Trade Description - Enter a brief description of the work included in each trade item.

Demolition - Enter description and dollar amount of demolition work necessary to condition site for building improvements, including the removal of existing structures, foundations, utilities, etc.

Other Fees - Enter a brief description of item involved and cost estimate for each item.

Signatures - Enter the firm name, signature of authorized officer of the Contractor and/or Mortgagor and the date the form was completed.

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
HOUSING - FEDERAL HOUSING COMMISSIONER

CONTRACTOR'S and/or MORTGAGOR'S
LAND IMPROVEMENT COST ESTIMATE
(SCHEDULES OF VALUES)

Date: December 28, 2024

Project No.: TBD

Sponsor: GREENSBORO HOUSING AUTHORITY

Accessory Structures (Identification):

Project: The Arbors at South Crossing

Location: West Florida Street, Greensboro, NC

This form represents the Contractors and/or Mortgagors firm costs and services as a basis for disbursing dollar amounts when the insured advances are requested. Detailed instructions for completing this form are included on the reverse side.

LINE	TRADE ITEM	ESTIMATED COST	TRADE DESCRIPTION
1	**EARTHWORK:**	**$1,084,243**	
2	Clearing & Grubbing	$354,200	LOD, Sediment & Erosion Controls, Rough Grading.
3	Stripping & Piling, Onsite cuts & fills	$551,463	Cut, Fill, Balance all work within ROW.
4	Demolition	$0	
5	Fill	$0	
6	Rock excavation	$0	
7	Bldg. Bulk Excav. & Backfill	$0	
8	Hauling	$0	
9	Miscellaneous	$178,580	Construction Staking, Material Testing, Miscellaneous Labor & Material.
10	**SITE UTILITIES:**	**$2,460,012**	
11	Water Supply & Related Items	$1,122,326	Labor & Material to Trench and Bed all Water Piping, Valves, Fittings, Fire Hydrants within ROW.
12	Sanitary Sewer & Related Items	$454,323	Labor & Material to Trench and Bed all Sanitary Piping, Fittings, Manholes, Cleanouts within ROW.
13	Electric Service & Connections	$0	
14	Street & Grounds Lighting	$0	
15	Gas Service & Connections	$0	
16	Heating Tunnels	$0	
17	Storm Sewer & Drainage	$883,363	Labor & Material to Trench and Bed all RCP Storm Piping, Inlets and Structures within ROW.
18	Miscellaneous	$0	
19	**ROADS AND WALKS**	**$954,690**	
20	Curbs and Gutters	$166,350	30" Curbs & Gutters, 24" Valley Gutters, 6" HD Concrete Aprons.
21	Pavement For Vehicular Area	$503,469	Fine Grading, 7" Stone Base, 2" Base Asphalt, 1" Finish Asphalt for Roadways within ROW.
22	Special Area Surfacing	$0	
23	Walks, Steps, handrails, etc.	$284,871	All Concrete Sidewalks and Handicap Ramps within ROW.
24	Miscellaneous	$0	
25	**SITE IMPROVEMENTS**	**$363,230**	
26	Equipment for Special Areas	$0	
27	Fences, Walls, etc.	$113,750	Protective Rails and Fencing at Pond Retaining Walls, Temporary Construction Fencing.
28	Trash Collection Stations	$0	
29	Street & Entrance Signs	$0	
30	Bridges	$0	
31	Swimming Pool	$0	
32	Mobile Home Pads	$0	
33	Miscellaneous	$249,480	Design and Construct Modular Block retaining Wall at Pond, Backfill Retaining Wall.
34	**LAWNS AND PLANTING:**	**$185,000**	
35	Top Soil & Improvement	$0	
36	Finish Grading	$0	
37	Seeding, Soding, Sprigging	$0	
38	Planting	$185,000	Street Trees in ROW, Plants and Seeding at Pond.
39	Miscellaneous	$0	
40	**TOTAL LAND IMPROVEMENTS**	**$5,047,175**	

Mortgagor: **GREENSBORO HOUSING AUTHORITY** By _____ Date_____

Contractor: **Hamel Builders, Inc. and C2 Contractors, LLC** By _____ Date_____

HUD _____ _____ Date_____

Chief, Cost Evaluation or Cost Analyst Dep. Dir. for Housing/Service Off. Supervisor

Replaces Previous Edition

HUD-92328-LI (11-81)

WORK SHEET

LAND IMPROVEMENT COST ESTIMATE

ITEM		QUANTITY On-Site	QUANTITY Off-Site	UNIT PRICE	ESTIMATED COST On-Site	ESTIMATED COST Off-Site	SUBTOTAL On-Site	SUBTOTAL Off-Site
EARTHWORK:								
Clearing and Grubbing	LS	1		106,000	106,000	-	354,200	-
Erosion Control	LS	1		248,200	248,200	-		
Strip & Pile / Onsite Cut & Fill	LS	1		551,463	551,463	-	551,463	-
Cut					-	-		
Move Existing Dirt Pile					-	-		
Building Pad Prep	N/A				-	-		
Demolition					-	-	-	-
Fill					-	-	-	-
					-	-		
					-	-		
Rock Excavation - Hoe Ram Time	N/A				-	-	-	-
					-	-		
Building Excavation & Backfill	N/A				-	-	-	-
					-	-		
Hauling	N/A				-	-	-	-
Miscellaneous	LS	1		63,580.00	63,580	-	178,580	-
Material Testing	LS	1		40,000.00	40,000	-		
Termite Protection	N/A				-	-		
Construction Stakeout / Surveying	LS	1		75,000	75,000	-		
					-	-		
SUBTOTAL EARTHWORK					1,084,243	-	**$1,084,243**	-
SITE UTILITIES:					-	-		
Water Supply	LS	1		1,122,326	1,122,326	-	1,122,326	-
8" CL52 DI	LF	3,440			-	-		
6" CL52 DI	LF	120			-	-		
4" CL52 DI	LF	260			-	-		
8" Gate Valves	EA	36			-	-		
Fire Hydrants	EA	8			-	-		
Misc. Fittings	LS	1			-			
Water Main Booster Pump Assembly	N/A				-	-		
Water Service/Connect. to Buildings	N/A				-	-		
					-	-		
Sanitary Sewer	LS	1		454,323	454,323	-	454,323	-
8" DIP	LF	260			-	-		
8" PVC	LF	2,180						
6" PVC	LF	120						
4" PVC	LF	260			-			
Dewatering & Stone Bedding	N/A				-	-		
Misc. Fittings & Valves	LS	1			-	-		
Sanitary Sewer Manholes	EA	22			-	-		
4x4 Cleanouts	EA				-	-		
Electric Service & Connections	LS				-	-	-	-
Utility Conduits	LS				-	-		
Street Lighting Standards	EA				-	-	-	-
Sport Courts					-	-		
Gas Service					-	-	-	-
Gas Connections					-	-		
Heating & Util. Tunnels					-	-	-	-
Storm Sewer Systems	LS	1		883,363	883,363	-	883,363	-
Structures	EA	53			-	-		
15" RCP	LF	546						
18" RCP	LF	554						
24" RCP	LF	1,438						
30" RCP	LF	655						
Stormwater Management	LS	1			-	-		
Drywells					-	-		
Miscellaneous					-	-	-	-
1000 Gallon Proceptor Oil / Water Separator	EA				-	-		
Bollards at Transformers	EA				-	-		
					-	-		
SUBTOTAL SITE UTILITIES					2,460,012	-	**$2,460,012**	-

WORK SHEET

LAND IMPROVEMENT COST ESTIMATE

ITEM		QUANTITY		UNIT	ESTIMATED COST		SUBTOTAL	
		On-Site	Off-Site	PRICE	On-Site	Off-Site	On-Site	Off-Site
ROADS AND WALKS:					-	-		
Curb & Gutter [ ] " x [ ]	LF	1		166,350	166,350	-	166,350	
30" Curb & Gutter	LF	5,830						
24" Valley Curb	LF	625						
Concrete Aprons	SF	4,605						
Mountable Curb [ ] " x [ ]	LF				-	-		
Roll Curb [ ] " x [ ]	LF				-	-		
Roadway Pavement Section	LS	1		503,469	503,469	-	503,469	-
Asphalt Roadway	SY	7,300			-	-		
Base	LS	1			-	-		
Fine Grading	LS	1			-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
					-	-		
Special Area Surfacing:					-	-	-	-
Base					-	-		
Surfacing					-	-		
					-	-		
					-	-		
Concrete Walks [ ] ' wide [ ] " thk	LS	1		284,871	284,871	-	284,871	-
Sidewalks	SF	49,950						
Handicap Ramps	EA	40						
Dumpster Pads	N/A				-	-		
Pipe Bollards	N/A				-	-		
					-	-		
Miscellaneous					-	-	-	-
Striping & Signs					-	-		
Retaining Walls	SEE SITE IMPROVEMENTS				-	-		
SUBTOTAL ROADS AND WALKS					954,690	-	**$954,690**	-
SITE IMPROVEMENTS					-	-		
Equipment - Special Areas					-	-	-	-
					-	-		
Fences	LS	1		113,750	113,750	-	113,750	-
Dumpster Enclosure Gates	N/A				-	-		
Dog Park Fence & Gates	N/A				-	-		
Vehicular Guardrail	N/A				-	-		
Retaining Wall Fence / Rails	LF	850			-	-		
Temporary Construction Fence	LF	5,000			-	-		
Dumpster Enclosure					-	-	-	-
					-	-		
Street Signs					-	-	-	-
Entrance Signs & Columns					-	-		
					-	-		
Bridges					-	-	-	-
					-	-		
Swimming Pool	LS				-	-	-	-
					-	-		
Mobile Home Pad					-	-	-	-
					-	-		
Miscellaneous	LS	1		249,480	249,480	-	249,480	-
Retaining Walls	SF	6,074			-	-		
Backfill Retaining Walls	TONS	8,000						
Dog Park Bench	N/A							
Pet Waste Station	N/A				-	-		
					-	-		
SUBTOTAL SITE IMPROVEMENTS					363,230	-	**$363,230**	-

WORK SHEET

LAND IMPROVEMENT COST ESTIMATE

ITEM		QUANTITY On-Site	QUANTITY Off-Site	UNIT PRICE	ESTIMATED COST On-Site	ESTIMATED COST Off-Site	SUBTOTAL On-Site	SUBTOTAL Off-Site
LAWNS AND PLANTING:					-	-		
Topsoil to be Purchased					-	-	-	-
					-	-		
Fine Grading					-	-	-	-
Planting Beds & Pits					-	-		
Seeding	SY				-	-	-	-
Temporary Stockpile Seeding	LS				-	-		
Sodding					-	-		
Sodding & Seed Pond Slopes					-	-		
					-	-		
Planting:	LS	1		185,000	185,000	-	185,000	-
Street Trees	LS	1			-	-		
Pond Plants and Seeding	LS	1			-	-		
					-	-		
					-	-		
					-	-		
					-	-		
Miscellaneous					-	-	-	-
Stepping Stones	EA				-	-		
					-	-		
SUBTOTAL LAWNS AND PLANTING					185,000	-	**$185,000**	-
TOTAL LAND IMPROVEMENTS (LINE 40, HUD-92328-LI)							**$ 5,047,175**	-

HUD-92328-LI (11-81)

ATTACHMENT B – PREVIOUS ENVIRONMENTAL DOCUMENTATION

- **2020 HUD Part 50 Environmental Review and Clearance**
- **2020 No Further Action Letter**

U.S. Department of Housing and Urban Development
451 Seventh Street, SW
Washington, DC 20410
www.hud.gov
espanol.hud.gov

Environmental Assessment Determinations and Compliance Findings for HUD-assisted Projects 24 CFR Part 50

Project Information

Project Name: Smith-Homes-Redevelopment

HEROS Number: 900000010166614

Applicant / Grant Recipient: Housing Authority of the City of Greesnboro

Point of Contact: Kenneth Parks

HUD Preparer: Gene Rahuba

Consultant (if applicable):

Point of Contact:

Project Location: , Greensboro, NC

Additional Location Information:
707 West Florida Street Greensboro, NC

Description of the Proposed Project [24 CFR 50.12 & 58.32; 40 CFR 1508.25]:
The subject property consists of 99 one-story and two-story multi-family apartment buildings, 10 one-story elderly apartment buildings, 1 single-story community building, and 1 single-story preschool/daycare building (Council House Child Development Center) constructed in 1952 and 1965. The subject property structures contain a total of 430 residential dwelling units and are situated on 51.46 acres of land. The subject property contains a gross building area of approximately 440,771 square fee. Located within the community building are offices, a kitchen, an auditorium, and maintenance/mechanical areas. Exterior property improvements

include playgrounds, landscaped regions, and asphalt parking areas. The subject property is serviced by electricity, natural gas, and municipally supplied water and sewer. The user is submitting a 9% Low-Income Housing Tax Credit (LIHTC) application to the North Carolina Housing Finance Agency (NCHFA).

Does this project involve over 200 lots, dwelling units, or beds?

No

✓ Yes (Consult early with the Environmental Clearance Officer (ECO), who is required to sign off on this project if it requires an Environmental Assessment)

Statement of Purpose and Need for the Proposal [40 CFR 1508.9(b)]:

RAD Conversion. The existing site will be divided into 2 sites (Site A - North of Florida Street and Site B - South of Florida Street). The project will be multi-phased named "The Arbors at South Crossing" which will consist of 21.97 acres located on the north side of Florida Street, containing 238 units including 80 units in Phase 1 ("Family"), 42 units in Phase II ("Seniors"), and 116 units in Phase III ("Family"). Additionally, the PHA plans to redevelop the south side of the existing site (22.16 acres).

Existing Conditions and Trends [24 CFR 58.40(a)]:

The subject property consists of 99 one-story and two-story multi-family apartment buildings, 10one-story elderly apartment buildings, 1 single-story community building, and 1 single-story preschool/daycare building constructed in 1952 and 1965.

Maps, photographs, and other documentation of project location and description:

Determination:

✓	Finding of No Significant Impact [24 CFR 58.40(g)(1); 40 CFR 1508.13] The project will not result in a significant impact on the quality of human environment
	Finding of Significant Impact

Review Certified by	Richard E. Baker, Director, Office of PH	**on**	12/21/2020

Funding Information

Grant / Project	HUD Program	Program Name

Identification Number		
NC0110001005	Rental Assistance Demonstration (RAD)	

Estimated Total HUD Funded, Assisted or Insured Amount: $3,000,000.00

Estimated Total Project Cost [24 CFR 58.2 (a)(5)]: $30,000,000.00

Compliance with 24 CFR §50.4, §58.5 and §58.6 Laws and Authorities

Compliance Factors: Statutes, Executive Orders, and Regulations listed at 24 CFR §50.4, §58.5, and §58.6	Are formal compliance steps or mitigation required?	Compliance determination (See Appendix A for source determinations)
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR §50.4 & § 58.6		
Airport Hazards Clear Zones and Accident Potential Zones; 24 CFR Part 51 Subpart D	☐ Yes ☑ No	The project site is not within 15,000 feet of a military airport or 2,500 feet of a civilian airport. The project is in compliance with Airport Hazards requirements.
Coastal Barrier Resources Act Coastal Barrier Resources Act, as amended by the Coastal Barrier Improvement Act of 1990 [16 USC 3501]	☐ Yes ☑ No	This project is not located in a CBRS Unit. Therefore, this project has no potential to impact a CBRS Unit and is in compliance with the Coastal Barrier Resources Act.
Flood Insurance Flood Disaster Protection Act of 1973 and National Flood Insurance Reform Act of 1994 [42 USC 4001-4128 and 42 USC 5154a]	☐ Yes ☑ No	Based on the project description the project includes no activities that would require further evaluation under this section. The project does not require flood insurance or is excepted from flood insurance. While flood insurance may not be mandatory in this instance, HUD recommends that all insurable structures maintain flood insurance under the National Flood Insurance Program (NFIP). The project is in compliance with Flood Insurance requirements.
STATUTES, EXECUTIVE ORDERS, AND REGULATIONS LISTED AT 24 CFR §50.4 & § 58.5		

Air Quality Clean Air Act, as amended, particularly section 176(c) & (d); 40 CFR Parts 6, 51, 93	☐ Yes ☑ No	The project's county or air quality management district is in attainment status for all criteria pollutants. The project is in compliance with the Clean Air Act.
Coastal Zone Management Act Coastal Zone Management Act, sections 307(c) & (d)	☐ Yes ☑ No	This project is not located in or does not affect a Coastal Zone as defined in the state Coastal Management Plan. The project is in compliance with the Coastal Zone Management Act.
Contamination and Toxic Substances 24 CFR 50.3(i) & 58.5(i)(2)]	☑ Yes ☐ No	Site contamination was evaluated as follows: ASTM Phase I ESA, ASTM Phase II ESA. On-site or nearby toxic, hazardous, or radioactive substances were found that could affect the health and safety of project occupants or conflict with the intended use of the property. The adverse environmental impacts can be mitigated. With mitigation, identified in the mitigation section of this review, the project will be in compliance with contamination and toxic substances requirements.
Endangered Species Act Endangered Species Act of 1973, particularly section 7; 50 CFR Part 402	☐ Yes ☑ No	This project will have No Effect on listed species due to the nature of the activities involved in the project. This project is in compliance with the Endangered Species Act.
Explosive and Flammable Hazards Above-Ground Tanks)[24 CFR Part 51 Subpart C	☐ Yes ☑ No	There are no current or planned stationary aboveground storage containers of concern within 1 mile of the project site. The project is in compliance with explosive and flammable hazard requirements.
Farmlands Protection Farmland Protection Policy Act of 1981, particularly sections 1504(b) and 1541; 7 CFR Part 658	☐ Yes ☑ No	This project does not include any activities that could potentially convert agricultural land to a non-agricultural use. The project is in compliance with the Farmland Protection Policy Act.
Floodplain Management Executive Order 11988, particularly section 2(a); 24 CFR Part 55	☐ Yes ☑ No	This project does not occur in a floodplain. The project is in compliance with Executive Order 11988.
Historic Preservation National Historic Preservation Act of 1966, particularly sections 106 and	☐ Yes ☑ No	Based on the project description the project has No Potential to Cause Effects. The project is in compliance

110; 36 CFR Part 800		with Section 106.
Noise Abatement and Control Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978; 24 CFR Part 51 Subpart B	☑ Yes ☐ No	A Noise Assessment was conducted. The noise level was normally unacceptable: 71.0 db. See noise analysis. The project is in compliance with HUD's Noise regulation with mitigation.
Sole Source Aquifers Safe Drinking Water Act of 1974, as amended, particularly section 1424(e); 40 CFR Part 149	☐ Yes ☑ No	The project is not located on a sole source aquifer area. The project is in compliance with Sole Source Aquifer requirements.
Wetlands Protection Executive Order 11990, particularly sections 2 and 5	☐ Yes ☑ No	The project will not impact on- or off-site wetlands. The project is in compliance with Executive Order 11990.
Wild and Scenic Rivers Act Wild and Scenic Rivers Act of 1968, particularly section 7(b) and (c)	☐ Yes ☑ No	This project is not within proximity of a NWSRS river. The project is in compliance with the Wild and Scenic Rivers Act.
HUD HOUSING ENVIRONMENTAL STANDARDS		
Housing Requirements (50) [MAP Guide - Chapter 9: Lead-based paint, Radon, and Asbestos]	☑ Yes ☐ No	See appendix for compliance with Housing Requirements.
ENVIRONMENTAL JUSTICE		
Environmental Justice Executive Order 12898	☐ Yes ☑ No	No adverse environmental impacts were identified in the project's total environmental review. The project is in compliance with Executive Order 12898.

Environmental Assessment Factors [24 CFR 58.40; Ref. 40 CFR 1508.8 &1508.27]

Impact Codes: An impact code from the following list has been used to make the determination of impact for each factor.
(1) Minor beneficial impact
(2) No impact anticipated
(3) Minor Adverse Impact – May require mitigation
(4) Significant or potentially significant impact requiring avoidance or modification which may require an Environmental Impact Statement.

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Conformance with Plans / Compatible Land Use and Zoning / Scale and Urban Design	2	The property is being split into 3 sections	

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Soil Suitability / Slope/ Erosion / Drainage and Storm Water Runoff	2	No evidence of soil problems or unstable conditions	
Hazards and Nuisances including Site Safety and Site-Generated Noise	2	No nuisances or hazards observed	
Energy Consumption/Energy Efficiency	2	Utilization of many energy efficient appliances and light fixtures	
SOCIOECONOMIC			
Employment and Income Patterns	1	Property rehab. will enhance infrastructure of the surrounding area and provide employment opportunities in the community	
Demographic Character Changes / Displacement	2	No demographic character changes or displacement are anticipated with proposed demolition, construction, and rehab.	
COMMUNITY FACILITIES AND SERVICES			
Educational and Cultural Facilities (Access and Capacity)	2	No impact	
Commercial Facilities (Access and Proximity)	2	No impacts	
Health Care / Social Services (Access and Capacity)	2	No impacts	
Solid Waste Disposal and Recycling (Feasibility and Capacity)	2	No impacts	
Waste Water and Sanitary Sewers (Feasibility and Capacity)	2	No impacts	
Water Supply (Feasibility and Capacity)	2	No impacts	
Public Safety - Police, Fire and Emergency Medical	2	No impacts	
Parks, Open Space and Recreation (Access and Capacity)	2	No impacts	
Transportation and Accessibility (Access and Capacity)	2	No impacts	
NATURAL FEATURES			

Environmental Assessment Factor	Impact Code	Impact Evaluation	Mitigation
LAND DEVELOPMENT			
Unique Natural Features /Water Resources	2	No impacts	
Vegetation / Wildlife (Introduction, Modification, Removal, Disruption, etc.)	2	No impact	
Other Factors	2	No other factors have been identified	

Supporting documentation
ER - Smith Homes Redevelopment(18).pdf

Additional Studies Performed:

Field Inspection [Optional]: Date and completed by:

List of Sources, Agencies and Persons Consulted [40 CFR 1508.9(b)]:
Housing Authority of the City of Greensboro City of Greensboro County of Guilford U.S. Department of HUD

List of Permits Obtained:

Public Outreach [24 CFR 58.43]:
PHA Annual Plan and RAD Conversion Meetings

Cumulative Impact Analysis [24 CFR 58.32]:
No impact (RAD Conversion)

Alternatives [24 CFR 58.40(e); 40 CFR 1508.9]

No Action Alternative [24 CFR 58.40(e)]

There property is transitioning to RAD (redevelopment of site)

Summary of Findings and Conclusions:
Mitigation of noise and hazards (asbestos and LBP)

Mitigation Measures and Conditions [CFR 1505.2(c)]:

Summarized below are all mitigation measures adopted by the Responsible Entity to reduce, avoid or eliminate adverse environmental impacts and to avoid non-compliance or non-conformance with the above-listed authorities and factors. These measures/conditions must be incorporated into project contracts, development agreements and other relevant documents. The staff responsible for implementing and monitoring mitigation measures should be clearly identified in the mitigation plan.

Law, Authority, or Factor	Mitigation Measure or Condition	Comments on Completed Measures	Complete
Contamination and Toxic Substances	Asbestos containing materials and lead-based paint LBP)	N/A	
Noise Abatement and Control	Design criteria with recommendations for exterior walls, exterior windows, and doors	N/A	
Housing Requirements (50)	Abatement of asbestos containing materials and lead-based paint (LBP)	N/A	
	Removal of asbestos containing materials and lead-based paint (LBP) and design criteria (exterior walls, windows, and doors) for noise attentuation	N/A	

Mitigation Plan
These actions will be designed in the demolition and construction designs

Supporting documentation on completed measures

APPENDIX A: Related Federal Laws and Authorities

Airport Hazards

General policy	Legislation	Regulation
It is HUD's policy to apply standards to prevent incompatible development around civil airports and military airfields.		24 CFR Part 51 Subpart D

1. To ensure compatible land use development, you must determine your site's proximity to civil and military airports. Is your project within 15,000 feet of a military airport or 2,500 feet of a civilian airport?

✓ **No**

Based on the response, the review is in compliance with this section. Document and upload the map showing that the site is not within the applicable distances to a military or civilian airport below

Yes

Screen Summary

Compliance Determination

The project site is not within 15,000 feet of a military airport or 2,500 feet of a civilian airport. The project is in compliance with Airport Hazards requirements.

Supporting documentation

ER - Smith Homes Redevelopment.pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Coastal Barrier Resources

General requirements	Legislation	Regulation
HUD financial assistance may not be used for most activities in units of the Coastal Barrier Resources System (CBRS). See 16 USC 3504 for limitations on federal expenditures affecting the CBRS.	Coastal Barrier Resources Act (CBRA) of 1982, as amended by the Coastal Barrier Improvement Act of 1990 (16 USC 3501)	

1. Is the project located in a CBRS Unit?

✓ No

Document and upload map and documentation below.

Yes

Compliance Determination

This project is not located in a CBRS Unit. Therefore, this project has no potential to impact a CBRS Unit and is in compliance with the Coastal Barrier Resources Act.

Supporting documentation

ER - Smith Homes Redevelopment(1).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Flood Insurance

General requirements	Legislation	Regulation
Certain types of federal financial assistance may not be used in floodplains unless the community participates in National Flood Insurance Program and flood insurance is both obtained and maintained.	Flood Disaster Protection Act of 1973 as amended (42 USC 4001-4128)	24 CFR 50.4(b)(1) and 24 CFR 58.6(a) and (b); 24 CFR 55.1(b).

1. Does this project involve financial assistance for construction, rehabilitation, or acquisition of a mobile home, building, or insurable personal property?

✓ No. This project does not require flood insurance or is excepted from flood insurance.

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

Based on the project description the project includes no activities that would require further evaluation under this section. The project does not require flood insurance or is excepted from flood insurance. While flood insurance may not be mandatory in this instance, HUD recommends that all insurable structures maintain flood insurance under the National Flood Insurance Program (NFIP). The project is in compliance with Flood Insurance requirements.

Supporting documentation

ER - Smith Homes Redevelopment(2).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Air Quality

General requirements	Legislation	Regulation
The Clean Air Act is administered by the U.S. Environmental Protection Agency (EPA), which sets national standards on ambient pollutants. In addition, the Clean Air Act is administered by States, which must develop State Implementation Plans (SIPs) to regulate their state air quality. Projects funded by HUD must demonstrate that they conform to the appropriate SIP.	Clean Air Act (42 USC 7401 et seq.) as amended particularly Section 176(c) and (d) (42 USC 7506(c) and (d))	40 CFR Parts 6, 51 and 93

1. Does your project include new construction or conversion of land use facilitating the development of public, commercial, or industrial facilities OR five or more dwelling units?

✓ Yes

No

Air Quality Attainment Status of Project's County or Air Quality Management District

2. Is your project's air quality management district or county in non-attainment or maintenance status for any criteria pollutants?

✓ No, project's county or air quality management district is in attainment status for all criteria pollutants.

Yes, project's management district or county is in non-attainment or maintenance status for the following criteria pollutants (check all that apply):

Screen Summary

Compliance Determination

The project's county or air quality management district is in attainment status for all criteria pollutants. The project is in compliance with the Clean Air Act.

Supporting documentation

ER - Smith Homes Redevelopment(3).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Coastal Zone Management Act

General requirements	Legislation	Regulation
Federal assistance to applicant agencies for activities affecting any coastal use or resource is granted only when such activities are consistent with federally approved State Coastal Zone Management Act Plans.	Coastal Zone Management Act (16 USC 1451-1464), particularly section 307(c) and (d) (16 USC 1456(c) and (d))	15 CFR Part 930

1. Is the project located in, or does it affect, a Coastal Zone as defined in your state Coastal Management Plan?

Yes

✓ No

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Screen Summary

Compliance Determination

This project is not located in or does not affect a Coastal Zone as defined in the state Coastal Management Plan. The project is in compliance with the Coastal Zone Management Act.

Supporting documentation

ER - Smith Homes Redevelopment(4).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Contamination and Toxic Substances

General requirements	Legislation	Regulations
It is HUD policy that all properties that are being proposed for use in HUD programs be free of hazardous materials, contamination, toxic chemicals and gases, and radioactive substances, where a hazard could affect the health and safety of the occupants or conflict with the intended utilization of the property.		24 CFR 58.5(i)(2) 24 CFR 50.3(i)

1. How was site contamination evaluated? Select all that apply. Document and upload documentation and reports and evaluation explanation of site contamination below.

- ✓ American Society for Testing and Materials (ASTM) Phase I Environmental Site Assessment (ESA)
- ✓ ASTM Phase II ESA
- Remediation or clean-up plan
- ASTM Vapor Encroachment Screening
- None of the Above

2. Were any on-site or nearby toxic, hazardous, or radioactive substances found that could affect the health and safety of project occupants or conflict with the intended use of the property? (Were any recognized environmental conditions or RECs identified in a Phase I ESA and confirmed in a Phase II ESA?)

No

✓ Yes

3. Mitigation

Document and upload the mitigation needed according to the requirements of the appropriate federal, state, tribal, or local oversight agency. If the adverse environmental effects cannot be mitigated, then HUD assistance may not be used for the project at this site.

Can adverse environmental impacts be mitigated?

Adverse environmental impacts cannot feasibly be mitigated.

✓ Yes, adverse environmental impacts can be eliminated through mitigation. Document and upload all mitigation requirements below.

4. Describe how compliance was achieved in the text box below. Include any of the following that apply: State Voluntary Clean-up Program, a No Further Action letter, use of engineering controls, or use of institutional controls.

Asbestos containing materials and lead-based paint LBP)

If a remediation plan or clean-up program was necessary, which standard does it follow?

✓ Complete removal

Risk-based corrective action (RBCA)

Screen Summary

Compliance Determination

Site contamination was evaluated as follows: ASTM Phase I ESA, ASTM Phase II ESA. On-site or nearby toxic, hazardous, or radioactive substances were found that could affect the health and safety of project occupants or conflict with the intended use of the property. The adverse environmental impacts can be mitigated. With mitigation, identified in the mitigation section of this review, the project will be in compliance with contamination and toxic substances requirements.

Supporting documentation

ER - Smith Homes Redevelopment(5).pdf

Are formal compliance steps or mitigation required?

✓ Yes

No

Endangered Species

General requirements	ESA Legislation	Regulations
Section 7 of the Endangered Species Act (ESA) mandates that federal agencies ensure that actions that they authorize, fund, or carry out shall not jeopardize the continued existence of federally listed plants and animals or result in the adverse modification or destruction of designated critical habitat. Where their actions may affect resources protected by the ESA, agencies must consult with the Fish and Wildlife Service and/or the National Marine Fisheries Service ("FWS" and "NMFS" or "the Services").	The Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq*.); particularly section 7 (16 USC 1536).	50 CFR Part 402

1. Does the project involve any activities that have the potential to affect specifies or habitats?

✓ No, the project will have No Effect due to the nature of the activities involved in the project.

This selection is only appropriate if none of the activities involved in the project have potential to affect species or habitats. Examples of actions without potential to affect listed species may include: purchasing existing buildings, completing interior renovations to existing buildings, and replacing exterior paint or siding on existing buildings.
Based on the response, the review is in compliance with this section.

No, the project will have No Effect based on a letter of understanding, memorandum of agreement, programmatic agreement, or checklist provided by local HUD office

Yes, the activities involved in the project have the potential to affect species and/or habitats.

Screen Summary

Compliance Determination

This project will have No Effect on listed species due to the nature of the activities involved in the project. This project is in compliance with the Endangered Species Act.

Supporting documentation

ER - Smith Homes Redevelopment(6).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Explosive and Flammable Hazards

General requirements	Legislation	Regulation
HUD-assisted projects must meet Acceptable Separation Distance (ASD) requirements to protect them from explosive and flammable hazards.	N/A	24 CFR Part 51 Subpart C

1. Is the proposed HUD-assisted project itself the development of a hazardous facility (a facility that mainly stores, handles or processes flammable or combustible chemicals such as bulk fuel storage facilities and refineries)?

✓ No

Yes

2. Does this project include any of the following activities: development, construction, rehabilitation that will increase residential densities, or conversion?

No

✓ Yes

3. Within 1 mile of the project site, are there any current or planned stationary aboveground storage containers that are covered by 24 CFR 51C? Containers that are NOT covered under the regulation include:

- **Containers 100 gallons or less in capacity, containing common liquid industrial fuels OR**
- **Containers of liquified petroleum gas (LPG) or propane with a water volume capacity of 1,000 gallons or less that meet the requirements of the 2017 or later version of National Fire Protection Association (NFPA) Code 58.**

If all containers within the search area fit the above criteria, answer "No." For any other type of aboveground storage container within the search area that holds one of the flammable or explosive materials listed in Appendix I of 24 CFR part 51 subpart C, answer "Yes."

✓ No

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Yes

Screen Summary

Compliance Determination

There are no current or planned stationary aboveground storage containers of concern within 1 mile of the project site. The project is in compliance with explosive and flammable hazard requirements.

Supporting documentation

ER - Smith Homes Redevelopment(7).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Farmlands Protection

General requirements	Legislation	Regulation
The Farmland Protection Policy Act (FPPA) discourages federal activities that would convert farmland to nonagricultural purposes.	Farmland Protection Policy Act of 1981 (7 U.S.C. 4201 et seq.)	7 CFR Part 658

1. Does your project include any activities, including new construction, acquisition of undeveloped land or conversion, that could convert agricultural land to a non-agricultural use?

Yes

✓ No

If your project includes new construction, acquisition of undeveloped land or conversion, explain how you determined that agricultural land would not be converted:

Existing Public Housing property/site

Based on the response, the review is in compliance with this section. Document and upload all documents used to make your determination below.

Screen Summary

Compliance Determination

This project does not include any activities that could potentially convert agricultural land to a non-agricultural use. The project is in compliance with the Farmland Protection Policy Act.

Supporting documentation

ER - Smith Homes Redevelopment(8).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Floodplain Management

General Requirements	Legislation	Regulation
Executive Order 11988, Floodplain Management, requires federal activities to avoid impacts to floodplains and to avoid direct and indirect support of floodplain development to the extent practicable.	Executive Order 11988	24 CFR 55

1. Do any of the following exemptions apply? Select the applicable citation? [only one selection possible]

55.12(c)(3)
55.12(c)(4)
55.12(c)(5)
55.12(c)(6)
55.12(c)(7)
55.12(c)(8)
55.12(c)(9)
55.12(c)(10)
55.12(c)(11)
✓ None of the above

2. Upload a FEMA/FIRM map showing the site here:

ER - Smith Homes Redevelopment(9).pdf

The Federal Emergency Management Agency (FEMA) designates floodplains. The FEMA Map Service Center provides this information in the form of FEMA Flood Insurance Rate Maps (FIRMs). For projects in areas not mapped by FEMA, use **the best available information** to determine floodplain information. Include documentation, including a discussion of why this is the best available information for the site.

Does your project occur in a floodplain?

✓ No

Based on the response, the review is in compliance with this section.

Yes

Screen Summary

Compliance Determination

This project does not occur in a floodplain. The project is in compliance with Executive Order 11988.

Supporting documentation

ER - Smith Homes Redevelopment(10).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Historic Preservation

General requirements	Legislation	Regulation
Regulations under Section 106 of the National Historic Preservation Act (NHPA) require a consultative process to identify historic properties, assess project impacts on them, and avoid, minimize, or mitigate adverse effects	Section 106 of the National Historic Preservation Act (16 U.S.C. 470f)	36 CFR 800 "Protection of Historic Properties" http://www.access.gpo.gov/nara/cfr/waisidx_10/36cfr800_10.html

Threshold

Is Section 106 review required for your project?

No, because the project consists solely of activities listed as exempt in a Programmatic Agreement (PA). (See the PA Database to find applicable PAs.)

✓ No, because the project consists solely of activities included in a No Potential to Cause Effects memo or other determination [36 CFR 800.3(a)(1)].

Yes, because the project includes activities with potential to cause effects (direct or indirect).

Threshold (b). Document and upload the memo or explanation/justification of the other determination below:

Reference SHPO Correspondence in attached ER - Smith Homes Redevelopment

Based on the response, the review is in compliance with this section.

Screen Summary

Compliance Determination

Based on the project description the project has No Potential to Cause Effects. The project is in compliance with Section 106.

Supporting documentation

ER - Smith Homes Redevelopment(11).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Noise Abatement and Control

General requirements	Legislation	Regulation
HUD's noise regulations protect residential properties from excessive noise exposure. HUD encourages mitigation as appropriate.	Noise Control Act of 1972 General Services Administration Federal Management Circular 75-2: "Compatible Land Uses at Federal Airfields"	Title 24 CFR 51 Subpart B

1. What activities does your project involve? Check all that apply:

✓ New construction for residential use

NOTE: HUD assistance to new construction projects is generally prohibited if they are located in an Unacceptable zone, and HUD discourages assistance for new construction projects in Normally Unacceptable zones. See 24 CFR 51.101(a)(3) for further details.

Rehabilitation of an existing residential property

A research demonstration project which does not result in new construction or reconstruction

An interstate land sales registration

Any timely emergency assistance under disaster assistance provision or appropriations which are provided to save lives, protect property, protect public health and safety, remove debris and wreckage, or assistance that has the effect of restoring facilities substantially as they existed prior to the disaster
None of the above

4**. Complete the Preliminary Screening to identify potential noise generators in the vicinity (1000' from a major road, 3000' from a railroad, or 15 miles from an airport).**

Indicate the findings of the Preliminary Screening below:

There are no noise generators found within the threshold distances above.

✓ Noise generators were found within the threshold distances.

5. **Complete the Preliminary Screening to identify potential noise generators in the**

Acceptable: (65 decibels or less; the ceiling may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

✓ Normally Unacceptable: (Above 65 decibels but not exceeding 75 decibels; the floor may be shifted to 70 decibels in circumstances described in §24 CFR 51.105(a))

Is your project in a largely undeveloped area?

✓ No

Indicate noise level here: 71

Document and upload noise analysis, including noise level and data used to complete the analysis below.

Yes

Unacceptable: (Above 75 decibels)

6. **HUD strongly encourages mitigation be used to eliminate adverse noise impacts. Explain in detail the exact measures that must be implemented to mitigate for the impact or effect, including the timeline for implementation. This information will be automatically included in the Mitigation summary for the environmental review.**

✓ Mitigation as follows will be implemented:

Design criteria with recommendations for exterior walls, exterior windows, and doors

Based on the response, the review is in compliance with this section. Document and

upload drawings, specifications, and other materials as needed to describe the project's noise mitigation measures below.

No mitigation is necessary.

Screen Summary

Compliance Determination

A Noise Assessment was conducted. The noise level was normally unacceptable: 71.0 db. See noise analysis. The project is in compliance with HUD's Noise regulation with mitigation.

Supporting documentation

ER - Smith Homes Redevelopment(12).pdf

Are formal compliance steps or mitigation required?

✓ Yes

No

Sole Source Aquifers

General requirements	Legislation	Regulation
The Safe Drinking Water Act of 1974 protects drinking water systems which are the sole or principal drinking water source for an area and which, if contaminated, would create a significant hazard to public health.	Safe Drinking Water Act of 1974 (42 U.S.C. 201, 300f et seq., and 21 U.S.C. 349)	40 CFR Part 149

1. Does the project consist solely of acquisition, leasing, or rehabilitation of an existing building(s)?

Yes

✓ No

2. Is the project located on a sole source aquifer (SSA)?

A sole source aquifer is defined as an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. This includes streamflow source areas, which are upstream areas of losing streams that flow into the recharge area.

✓ No

Based on the response, the review is in compliance with this section. Document and upload documentation used to make your determination, such as a map of your project (or jurisdiction, if appropriate) in relation to the nearest SSA and its source area, below.

Yes

Screen Summary

Compliance Determination

The project is not located on a sole source aquifer area. The project is in compliance with Sole Source Aquifer requirements.

Supporting documentation

ER - Smith Homes Redevelopment(13).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Wetlands Protection

General requirements	Legislation	Regulation
Executive Order 11990 discourages direct or indirect support of new construction impacting wetlands wherever there is a practicable alternative. The Fish and Wildlife Service's National Wetlands Inventory can be used as a primary screening tool, but observed or known wetlands not indicated on NWI maps must also be processed Off-site impacts that result in draining, impounding, or destroying wetlands must also be processed.	Executive Order 11990	24 CFR 55.20 can be used for general guidance regarding the 8 Step Process.

1. Does this project involve new construction as defined in Executive Order 11990, expansion of a building's footprint, or ground disturbance? The term "new construction" shall include draining, dredging, channelizing, filling, diking, impounding, and related activities and any structures or facilities begun or authorized after the effective date of the Order

No

✓ Yes

2. Will the new construction or other ground disturbance impact an on- or off-site wetland? The term "wetlands" means those areas that are inundated by surface or ground water with a frequency sufficient to support, and under normal circumstances does or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

"Wetlands under E.O. 11990 include isolated and non-jurisdictional wetlands."

✓ No, a wetland will not be impacted in terms of E.O. 11990's definition of new construction.

Based on the response, the review is in compliance with this section. Document and upload a map or any other relevant documentation below which explains your determination

Yes, there is a wetland that be impacted in terms of E.O. 11990's definition of new construction.

Screen Summary

Compliance Determination

The project will not impact on- or off-site wetlands. The project is in compliance with Executive Order 11990.

Supporting documentation

ER - Smith Homes Redevelopment(14).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Wild and Scenic Rivers Act

General requirements	Legislation	Regulation
The Wild and Scenic Rivers Act provides federal protection for certain free-flowing, wild, scenic and recreational rivers designated as components or potential components of the National Wild and Scenic Rivers System (NWSRS) from the effects of construction or development.	The Wild and Scenic Rivers Act (16 U.S.C. 1271-1287), particularly section 7(b) and (c) (16 U.S.C. 1278(b) and (c))	36 CFR Part 297

1. Is your project within proximity of a NWSRS river?

✓ No

Yes, the project is in proximity of a Designated Wild and Scenic River or Study Wild and Scenic River.
Yes, the project is in proximity of a Nationwide Rivers Inventory (NRI) River.

Screen Summary
Compliance Determination
This project is not within proximity of a NWSRS river. The project is in compliance with the Wild and Scenic Rivers Act.

Supporting documentation

ER - Smith Homes Redevelopment(15).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

Housing Requirements

General requirements	Legislation	Regulations
Many Housing Programs have additional requirements beyond those listed at 50.4. Some of these relate to compliance with 50.3(i) and others relate to site nuisances and hazards		24 CFR 50.3(i) 24 CFR 35

Hazardous Substances

Requirements for evaluating additional housing requirements vary by program. Refer to the appropriate guidance for the program area (i.e, the Multifamily Accelerated Processing (MAP) guide, Chapter 7 of the Healthcare Mortgage Insurance Handbook, etc.) for specific requirements.

Lead-based paint

Was a lead-based paint inspection or survey performed by the appropriate certified lead professional?

✓ Yes

No, because the project was previously deemed to be lead free.

No, because the project does not involve any buildings constructed prior to 1978.

No, because program guidance does not require testing for this type of project
For example: HUD's lead-based paint requirements at 24 CFR Part 35 do not apply to housing designated exclusively for the elderly or persons with disabilities, unless a child of less than 6 years of age resides or is expected to reside in such housing. In addition, the requirements do not apply to 0-bedroom dwelling units.

Was lead-based paint identified on site?

✓ Yes

No

Reference attached ER - Smith Homes Redevelopment

Radon

Was radon testing performed following the appropriate and latest ANSI-AARST standard?

Yes

✓ No, because program guidance does not require testing for this type of project.
Note that radon testing is encouraged for all HUD projects, even where it is not required.
Explain why radon testing was not completed below.

Reference attached ER - Smith Homes Redevelopment

Asbestos

Was a comprehensive asbestos building survey performed pursuant to the relevant requirements of the latest ASTM standard?

✓ Yes

No, because the project does not involve any buildings constructed prior to 1978.
Provide documentation of construction date(s) below.

No, because program guidance does not require testing for this type of project
Explain in textbox below.

Was asbestos identified on site?

Yes, friable or damaged asbestos was identified.
Refer to program guidance for remediation requirements. Describe the testing procedure and findings in the textbox below and any necessary mitigation measures in the Mitigation textbox at the bottom of this screen. Upload all documentation below.

✓ Yes, asbestos was identified, but it was not friable or damaged
Refer to program guidance for remediation requirements. Describe the testing procedure and findings in the textbox below and any necessary mitigation measures in the Mitigation

textbox at the bottom of this screen. Upload all documentation below.

No

Reference attached ER - Smith Homes Redevelopment

Additional Nuisances and Hazards

Many Housing Programs have additional requirements with respect to common nuisances and hazards. These include High Pressure Pipelines; Fall Hazards (High Voltage Transmission Lines and Support Structures); Oil or Gas Wells, Sour Gas Wells and Slush Pits; and Development planned on filled ground. There may also be additional regional or local requirements.

Mitigation

Describe all mitigation measures that will be taken for the Housing Requirements.

Abatement of asbestos containing materials and lead-based paint (LBP)

Screen Summary

Compliance Determination

See appendix for compliance with Housing Requirements.

Supporting documentation

ER - Smith Homes Redevelopment(16).pdf

Are formal compliance steps or mitigation required?

✓ Yes

No

Environmental Justice

General requirements	Legislation	Regulation
Determine if the project creates adverse environmental impacts upon a low-income or minority community. If it does, engage the community in meaningful participation about mitigating the impacts or move the project.	Executive Order 12898	

HUD strongly encourages starting the Environmental Justice analysis only after all other laws and authorities, including Environmental Assessment factors if necessary, have been completed.

1. Were any adverse environmental impacts identified in any other compliance review portion of this project's total environmental review?

Yes

✓ No

Based on the response, the review is in compliance with this section.

Screen Summary

Compliance Determination

No adverse environmental impacts were identified in the project's total environmental review. The project is in compliance with Executive Order 12898.

Supporting documentation

ER - Smith Homes Redevelopment(17).pdf

Are formal compliance steps or mitigation required?

Yes

✓ No

From: Gene Mao
To: Lucas Hamelman
Cc: Kromm, Carin
Subject: Groundwater Contamination at 707 W. Florida Street, Greensboro, NC
Date: Thursday, May 21, 2020 9:11:39 AM

Mr. Hamelman,

I have reviewed the Limited Phase I and II Environmental Site Assessment (LSA) Reports received on April 27, 2020. A review of the reports indicates that benzene and 1,2-dichloroethane were detected in SB-1 at concentrations of 1.64 and 0.528 ppb, respectively. They were slightly higher than their respective 2L standards of 1.0 and 0.4 ppb. Because no water supply well is located in the area and low levels of benzene and 1,2-dichlorethane in groundwater sample from SB-1, the risk is low.

Because SB-1 was located downgradient from a UST incident, City of Greensboro- Freeman Mill (#14872), the contaminants detected in a groundwater sample collected from SB-1 may be from this UST incident due to potential contaminated groundwater offsite migration. Therefore, no new incident will be established. The Phase I and Phase II LSA reports for the property at 707 W. Florida Street are filed with incident #14872.

If you have questions, feel free to contact me.

Thanks.

Gene Mao, PG
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