



Project Manual

Specifications and Other Documents
for

Dowdy Park – Phase One

Town of Nags Head
Nags Head, NC

BID Documents
June 2, 2016

Addendum #1 Issued June 22, 2016

Town of Nags Head Dept. of Public Works

P.O. Box 99
Nags Head, NC 27959
252.441.6221 phone
252.441.3350 fax
www.nagsheadnc.gov

CLH Design, PA

400 Regency Forest Dr.
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Cary, NC 27518
919.319.6716 phone
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Pace Collaborative

1277 Perimeter Parkway
Virginia Beach, VA 23454
757.499.7223 phone
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Cahoon + Kasten Architects

118 W. Woodhill Dr.
Nags Head, NC 27959
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TABLE OF CONTENTS

Project: Dowdy Park – Phase One
 Nags Head, NC 27959
 Town of Nags Head
 Project ID #

Table of Contents	TOC-1 thru 4
Seal Page	1 thru 1
Advertisement for Bids	1 thru 2
Instructions to Bidders	1 thru 11
General Conditions	GC-1 thru GC-17
Supplemental General Conditions	SGC-1 thru SGC-10

DIVISION 1 - GENERAL REQUIREMENTS

Section		
002513	PreBid Meeting	002513-1 thru 2
011000	Summary	011000-1 thru 3
012200	Unit Prices	012200-1 thru 1
012300	Alternates	012300-1 thru 2
012500	Substitution Procedures	012500-1 thru 3
	Substitution Request Form (CSI 13.1 A)	1 thru 2
012600	Contract Modification Procedures	012600-1 thru 3
012900	Payment Procedures	012900-1 thru 2
013100	Project Management and Coordination	013100-1 thru 6
013200	Construction Progress Documentation	013200-1 thru 5
013233	Photographic Documentation	013233-1 thru 2
013300	Submittal Procedures	013300-1 thru 6
	Submittal Cover Form	1 thru 1
014000	Quality Requirements	014000-1 thru 6
015000	Temporary Facilities and Controls	015000-1 thru 5
016000	Product Requirements	016000-1 thru 6
017300	Execution	017300-1 thru 6
017419	Construction Waste Management and Disposal of Nonhazardous Materials	017419-1 thru 6

017700	Closeout Procedures	017700-1 thru 4
017823	Operation and Maintenance Data	017823-1 thru 7
017839	Project Record Documents	017839-1 thru 4
017900	Demonstration and Training	017900-1 thru 5

DIVISION 3 - CONCRETE

Section

033000	Cast-In-Place Concrete	033000-1 thru 9
--------	------------------------	-----------------

DIVISION 5 - METALS

Section

051200	Structural Steel Framing	051200-1 thru 4
--------	--------------------------	-----------------

DIVISION 6 - WOOD, PLASTICS, AND COMPOSITES

Section

061053	Miscellaneous Rough Carpentry	061053-1 thru 4
061533	Wood Patio Decking / Wavy Walkway – Performance Specification	061533- 1 thru 8
061600	Sheathing	061600- 1 thru 2
061800	Glue Laminated Construction	061800-1 thru 3
062013	Exterior Finish Carpentry	062013-1 thru 3

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

Section

074113	Standing-Seam Metal Roof Panels	074113-1 thru 7
075423	Thermoplastic Polyolefin (TPO) Roofing	075423-1 thru 4
074625	Wood Shingle and Shake Siding	074600-1 thru 3

DIVISION 8 - OPENINGS

Section

081113	Hollow Metal Doors and Frames	081113-1 thru 5
--------	-------------------------------	-----------------

DIVISION 9 - FINISHES

Section

099113	Exterior Painting	099113-1 thru 3
--------	-------------------	-----------------

DIVISION 22 - PLUMBING

Section

220523	General-Duty valves for Plumbing Piping	220523-1 thru 3
221116	Domestic Water Piping	221116-1 thru 7

DIVISION 26 - ELECTRICAL

Section

260500	Electrical General Provisions	260500-1 thru 7
260519	Low-Voltage Electrical Power Conductors and Cables	260519-1 thru 2
260526	Grounding and Bonding for Electrical Systems	260526-1 thru 3
260529	Hangars and Supports for Electrical Systems	260529-1 thru 3
260533	Raceways and Boxes for Electrical Systems	260533-1 thru 4
260553	Identification for Electrical Systems	260553-1 thru 3
260923	Lighting Control Devices	260923-1 thru 2
262416	Panelboards	262416-1 thru 3
262726	Wiring Devices	262726-1 thru 3
262813	Fuses	262813-1 thru 2
262816	Enclosed Switches and Circuit Breakers	262816-1 thru 2
265600	Lighting	265600-1 thru 5

DIVISION 31 – EARTHWORK

Section

313116	Termite Control	313116-1 thru 3
311000	Site Clearing	311000-1 thru 5
312000	Earth Moving - Classified	312000-1 thru 14
312500	Erosion Controls	312500-1 thru 6

DIVISION 32 - EXTERIOR IMPROVEMENTS

Section

321216	Asphalt Paving	321216-1 thru 6
321313	Concrete Paving	321313-1 thru 12
321416	Unit Pavers	321416-1 thru 4
324000	Site Furnishings	324000-1 thru 4

DIVISION 33 – UTILITIES

Section		
331000	Site Water Utilities	331000-1 thru 10
334000	Storm Drainage Utilities	334000-1 thru 7
FORMS		
Proposal Form for Construction		1 thru 7
Bid Bond Form		1 thru 2
MBE Forms		1 thru 7
Nondiscrimination Clause		
Minimum Compliance Requirements		
Identification of Minority Business Participation		
Affidavit A		
Affidavit B		
Affidavit C		
Affidavit D		
Sample Agreement Between Owner and Contractor for Construction Contractor (Stipulated Price)		1 thru 10
Performance Bond Form		1 thru 3
Payment Bond Form		1 thru 3

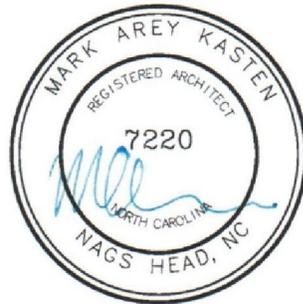
Dowdy Park – Phase One
Nags Head, NC
Town of Nags Head Project ID #

Professional Seals

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(Landscape Architecture/
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400 Regency Forest Dr. STE 120
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Cahoon + Kasten Architects
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118 W. Woodhill Dr.
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06/02/16



5-31-2016

Pace Collaborative
(Mechanical/Electrical/
Plumbing Engineers)
1277 Perimeter Parkway
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6/2/16



Town of Nags Head

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TOWN OF NAGS HEAD
c/o CLIFF OGBURN, TOWN MANAGER
NAGS HEAD, NORTH CAROLINA
DOWDY PARK – PHASE ONE DEVELOPMENT

ADVERTISEMENT FOR FORMAL BIDS

Sealed Bids for the construction of the **DOWDY PARK – PHASE ONE DEVELOPMENT** will be received, by **TOWN OF NAGS HEAD** at the **BOARD ROOM** located at **5401 S. CROATAN HWY., NAGS HEAD, NORTH CAROLINA**, until **2:00 PM** local time on **JUNE 30, 2016**, at which time the Bids received will be **PUBLICLY** opened and read. The Project consists of constructing **A NEW MULTI-PURPOSE BUILDING, NEW PARKING LOT, PAVED TRAILS, ASSOCIATED PLUMBING AND ELECTRICAL DEVELOPMENT, NEW SITE LIGHTING AND RELATED SITE AND INFRASTRUCTURE IMPROVEMENTS**. Please note that Other Work will be conducted on the site and bid and performed separately by others including, but not limited to; playground equipment purchase, installation & surface improvements, landscaping and irrigation work.

Bids will be received for a single prime Contract. Bids shall be on a lump sum price basis, with additive alternate bid items as indicated in the Bid Form.

A pre-bid conference will be held at 11:00 am on June 16, 2016 at the Town of Nags Head Board Room located at 5401 S. Croatan Hwy., Nags Head, North Carolina 27959. Attendance at the Pre-Bid conference is strongly encouraged for all bidders, but is not mandatory.

The Issuing Office for the Bidding Documents is: **TOWN OF NAGS HEAD DEPARTMENT OF PUBLIC WORKS, 2200 LARK AVE, NAGS HEAD, NC, 27959, (P) 252.441.1122. THE POINT OF CONTACT FOR THIS PROJECT IS DAVID RYAN, PE, PROJECT COORDINATOR FOR THE TOWN OF NAGS HEAD, email address DAVID.RYAN@NAGSHEADNC.GOV**. Prospective Bidders may examine printed copies of the Bidding Documents at the Issuing Office and in the upstairs lobby at Nags Head Town Hall, 5401 S. Croatan Hwy. on Mondays through Fridays between the hours of **8:30 am and 3:30 pm** and may obtain printed copies of the Bidding Documents from the Issuing Office as described above.

Electronic copies, as “zipped” portable document format (PDF) files, of the Bidding Documents shall be made available for download from the Town of Nags Head Website at www.nagsheadnc.gov; Town Departments/Administration/Town Clerk/Bid Notices/Public Notices at no charge. Bidders are encouraged to obtain the project information via this method.

Printed copies may be provided from the Issuing Office upon request. The cost of printed Bidding Documents, from the Issuing Office is a **\$100.00** nonrefundable fee payable via cash, check or credit card. The delivery method of these documents will be provided for Bidder pick-up only.

All Contractors submitting bids shall possess a valid North Carolina Contractors License and may be required to provide evidence satisfactory to the Town of Nags Head, in its sole judgment, of qualifications and experience sufficient for the successful accomplishment of a project of this nature and size within the time requirements set forth in the Contract Documents.

In accordance with N.C.G.S. 143-129(b); 143-132 a Bid must be accompanied by Bid security made payable to Owner in an amount of 5% percent of Bidder's maximum Bid price. The successful Bidder shall be required to furnish a Construction Payment and Construction Performance Bond for 100% of the contract amount as security for the faithful performance and the payment of all bills and obligations arising from the performance of the Contract.

Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors, the award may be made to said Successful Bidder on its Base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award and in the interest of the Town of Nags Head.

Owner also reserves the right to waive informalities or minor defects and to reject any or all bids.

The bidder to whom this project is awarded shall have until **December 31, 2016** to Substantially Complete the Project. Other provisions as to time of Full Completion, project milestones, Liquidated Damages, etc. are set forth in the Contract Documents.

All bids must be submitted on the Town provided bid form, which is attached hereto. No bids shall be considered unless all required information is included as specified.

This the 2nd day of June, 2016.

+ + END OF ADVERTISEMENT FOR BIDS + +

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACTS

Prepared by



Issued and Published Jointly by



INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

	Page
ARTICLE 1 – Defined Terms.....	1
ARTICLE 2 – Copies of Bidding Documents	1
ARTICLE 3 – Qualifications of Bidders.....	1
ARTICLE 4 – Site and Other Areas; Existing Site Conditions; Examination of Site; Owner’s Safety Program; Other Work at the Site.....	1
ARTICLE 5 – Bidder’s Representations.....	3
ARTICLE 6 – Pre-Bid Conference	4
ARTICLE 7 – Interpretations and Addenda.....	4
ARTICLE 8 – Bid Security	4
ARTICLE 9 – Contract Times	5
ARTICLE 10 – Liquidated Damages.....	5
ARTICLE 11 – Substitute and “Or-Equal” Items.....	5
ARTICLE 12 – Subcontractors, Suppliers, and Others	5
ARTICLE 13 – Preparation of Bid	6
ARTICLE 14 – Basis of Bid	6
ARTICLE 15 – Submittal of Bid.....	7
ARTICLE 16 – Modification and Withdrawal of Bid.....	7
ARTICLE 17 – Opening of Bids.....	7
ARTICLE 18 – Bids to Remain Subject to Acceptance	8
ARTICLE 19 – Evaluation of Bids and Award of Contract	8
ARTICLE 20 – Bonds and Insurance.....	9
ARTICLE 21 – Signing of Agreement.....	9
ARTICLE 22 – Sales and Use Taxes	9
ARTICLE 23 – Contracts to be Assigned-deleted.....	9
ARTICLE 24 – MINORITY BUSINESS GOAL	9

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer / Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer / Architect, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Evidence of Bidder's authority to do business in the state where the Project is located.

B. Bidder's state or other contractor license number, if applicable.

C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
 - 1. The Supplementary Conditions identify:
 - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
 - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
 - 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer / Architect by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

- D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;
- E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer / Architect written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer / Architect is acceptable to Bidder;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

- 6.01 A pre-bid conference will be held at 11:00 am on June 16, 2016 at the Town of Nags Head Board Room located at 5401 S. Croatan Hwy., Nags Head, North Carolina, 27959. Attendance at the Pre-Bid conference is strongly encouraged for all bidders, but is not mandatory.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer / Architect in writing. Interpretations or clarifications considered necessary by Engineer / Architect in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than seven days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 7.02 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

- 8.01 In accordance with N.C.G.S. 143-129(b); 143-132 a Bid must be accompanied by Bid security made payable to Owner in an amount of 5% percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of the General Conditions. The bid deposit/bond must accompany the bid at the time the bid is filed.
- 8.02 The successful bidder forfeits his bid deposit/bond if he does not execute the contract within 10 days after award or fails to provide performance or payment bonds.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND “OR-EQUAL” ITEMS

- 11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those “or-equal” or substitute or materials and equipment subsequently approved by Engineer / Architect prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer / Architect as an “or-equal” or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer / Architect at least 15 days prior to the date for receipt of Bids. Each such request shall comply with the requirements of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer / Architect’s decision of approval or disapproval of a proposed item will be final. If Engineer / Architect approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.
- 12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.
- 12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the scope of the Work.

If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer / Architect, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, **without an increase in Bid price.**

- 12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will **not** constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer / Architect makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer / Architect subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents.
- A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.
 - B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the corporate secretary or an assistant corporate secretary. The corporate address and state of incorporation shall be shown.
- 13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership’s address for receiving notices shall be shown.
- 13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm’s address for receiving notices shall be shown.
- 13.05 A Bid by an individual shall show the Bidder’s name and address for receiving notices.
- 13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture’s address for receiving notices shall be shown.
- 13.07 All names shall be printed in ink below the signatures.
- 13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.10 The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder’s state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID

- 14.01 Base Bid with Alternates

Bidders shall submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

ARTICLE 15 – SUBMITTAL OF BID

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to **Mr. Cliff Ogburn, Town Manager, Town of Nags Head, 5401 S. Croatan Hwy., Nags Head, NC 27959**
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If within 72 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid that was clerical in nature (not a judgement error), and the bid was submitted in good faith that Bidder may withdraw its Bid, and the Bid security will be returned. The Town of Nags Head shall promptly hold a hearing on the bidder's request and shall issue a written decision within 5 days of the hearing. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work or provide materials, equipment, or labor to a contractor or subcontractor performing on the contract.

ARTICLE 17 – OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security, as applicable, prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

19.03 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

C. Bid prices will be compared after adjusting for differences in time of Substantial Completion (total number of calendar days to substantially complete the Work) designated by Bidders. The adjusting amount will be determined at the rate set forth in the Agreement for liquidated damages for failing to achieve Substantial Completion, or such other amount that Owner has designated in the Bid Form.

1. The method for calculating the lowest bid for comparison will be the summation of the Bid price shown in the Bid Form plus the product of the Bidder-specified time of Substantial Completion (in calendar days) times the rate for liquidated damages (in dollars per day).

2. This procedure is only used to determine the lowest bid for comparison and contractor selection purposes. The Contract Price for compensation and payment purposes remains the Bid price shown in the Bid Form.

19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

20.01 The General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22 – SALES AND USE TAXES

22.01 Each successful bidder shall follow the procedure outlined and attached to the bid proposal form for sales tax expenditures.

22.02 The Contractor shall provide a sales tax statement certifying the amount of sales taxes paid for the work provided under the contract. Manufacturers are not exempt from paying North Carolina sales taxes for providing an item directly to the Town of Nags Head. Manufacturers making a retail sale to the Town of Nags Head are liable for collection and remitting of the taxes on the sale in accordance with the N.C State regulation #42. If you have any questions about the sales tax requirements for the State of North Carolina contact the Sales Tax Division, Department of Revenue at (919) 733-3661

ARTICLE 23 – CONTRACTS TO BE ASSIGNED-DELETED.

ARTICLE 24 – MINORITY BUSINESS GOAL

24.01 Town of Nags Head Policy (Pending Amendment and Adoption)

- A. The Town of Nags Head prohibits discrimination in any manner on any basis prohibited by applicable Federal or State Law and will pursue an affirmative policy of fostering, promoting and conducting business with women and minority owned business enterprises.
- B. It is the policy of the Town to facilitate the establishment, preservation, and strengthening of small businesses and businesses owned by women and minorities and to encourage their participation in the Town's procurement activities. Every effort should be made by the Contractor/Subcontractor/Supplier to use minorities or women-owned businesses in order to reach the above stated goal. Toward that end, the Town encourages these firms to compete and encourages non-minority firms to provide for the participation of small businesses and businesses owned by women and minorities through subcontracting, partnerships, joint ventures, and other contractual opportunities. Compliance and exceptions to the participation goal will be reviewed on each individual project.
 1. The Minority Business Guidelines pursuant to North Carolina General Statute Section 143-128 (c) as originally enacted and effective June 28,1989.

- a. The term "Minority Business" means business;
 - 1) In which at least fifty-one percent is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent of the stock is owned by one or more minority persons; and
 - 2) Of which the management and daily business operations are controlled by one or more of the minority persons who own it.
 - b. The term "Minority Person" means a person who is a citizen or lawful permanent resident of the United States and who is:
 - 1) African American, that is, a person having origins in any of the black racial groups in Africa:
 - 2) Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race:
 - 3) Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands:
 - 4) American Indian or Alaskan Native, that is, a person having origins in any of the original peoples of North America: or
 - 5) Female.
2. Nothing in these instructions or the contract(s) awarded shall be construed to require bidders, contractors, or the Town to award contracts or subcontracts to or to make purchases of materials or equipment from minority business contractors, subcontractors, or suppliers who do not submit the lowest responsible bid or bids.
 3. The Guidelines for Recruitment and Selection of Minority Businesses for Participation in Town Construction Contracts are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership.
 4. Minority Business Subcontract Goals
 - a. The goals for participation by minority firms as subcontractors on this project have been set at 10%.
 - b. The bidder must identify on its bid, the minority business that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts or affidavit (Affidavit B) of self-performance work, if the bidder will perform work under contract by its own workforce as required by G.S. 143-128.2 (c) and G.S. 143-128 (f).
 - c. The lowest responsible bidder must execute and provide Affidavit C that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal: OR
 - d. Execute and provide Affidavit D that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal: OR

- e. Execute and provide Affidavit B which includes sufficient information for the Town to determine that the bidder does not customarily subcontract work on this type of project.
 - f. The Bidder(s) shall adhere to the Minority Business Minimum Compliance Requirements as located in the Project Forms Section.
 - g. **The above information must be provided as required. Failure to submit these documents is ground for rejection of bid.**
5. Actions to be Taken by the Bidder(s)
- a. The Bidder(s) agrees to follow the Minority Business Guidelines and exercise a good faith effort to recruit and select Minority Business for participation in any contract awarded to the Bidder on this Project to the fullest extent consistent with the efficient and economic performance of the contract awarded.
 - b. The Bidder(s) shall provide a completed list of awards which have been or will be offered to minority subcontractors and suppliers and a list of others which were recruited. The form provided herein shall be utilized for this reporting.
 - c. The Bidder(s) shall provide a list of any changes in the subcontractors and suppliers with the pay requests when submitted, to indicate any change in status of minority businesses used on this project.
 - d. The Contractor shall keep records of the contacts made in obtaining the bid information and number of attempts to get minority businesses to respond, as well as other methods utilized to obtain minority participation. Copies of this information will be required upon acknowledgement of being the low bidder and shall be provided with the contracts when completed for submittal to the Town for award.
6. Minority Business Information to be prepared and provided by Bidder(s)
- The following forms are provided herein, Project Forms:
- a. Execute and provide Nondiscrimination Clause form:
 - b. Execute and provide the Identification of Minority Business Participation form:
AND
 - c. Execute and provide Affidavit A/Affidavit B/Affidavit C/Affidavit D as described in Section 24.01.4 above.

GENERAL CONDITIONS

INDEX TO GENERAL CONDITIONS

SECTION	TITLE	PAGE
01	Definitions of Terms	GC-2
02	Applicable Requirements	GC-3
03	Contract Security	GC-3
04	Notice & Service Thereof	GC-4
05	Specifications	GC-4
06	Drawings & Specifications	GC-4
07	Present Documents Govern	GC-5
08	Contractor's Shop Drawings	GC-5
09	Instructions, Changes, Etc.	GC-6
10	Exam. of Work by Contractor	GC-6
11	Materials/Services/Facilities	GC-6
12	"Or Equal" Clause	GC-7
13	Inspection & Testing of Materials	GC-7
14	Inspection of Work	GC-7
15	Authority of the Town of Nags Head	GC-8
16	Prohibited Interests	GC-8
17	Rejections of Work & Materials	GC-8
18	Weather Conditions	GC-9
19	Royalties & Patents	GC-9
20	Contractor's Personnel	GC-9
21	Lines, Grades, & Measurements	GC-9
22	Permits & Licenses	GC-10
23	Laws & Regulations	GC-10
24	Contractor's Obligations	GC-10
25	Subcontracting	GC-11
26	Assignments	GC-11
27	Contractor's Hold Harmless Agreement	GC-11
28	Insurance Requirements	GC-11
29	Land & Rights-of-Way	GC-12
30	Protection of Work/Prop. /Persons	GC-13
31	Prior Use by the Town	GC-14
32	Cleaning Up	GC-14
33	Barricades	GC-14
34	Changes in the Work	GC-14
35	Time for Completion. /Liquidated Dam.	GC-15
36	Payments to Contractor	GC-15
37	Schedules, Reports and Records	GC-16
38	Town's Right to Suspend or Terminate	GC-16
39	Acceptance of Work and Final Payment	GC-16
40	Guarantee and Correction of Work	GC-17
41	Venue	GC-17

1. DEFINITIONS OF TERMS

Wherever used in the Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

"Addenda" shall mean written or graphic instruments issued prior to the execution of the agreement, which modify or interpret the Contract Documents by additions, deletions, clarifications, or corrections.

"Agreement"—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer/Architect, and designates the specific items that are Contract Documents

"Bid" shall mean the offer or Proposal of the Bidder submitted on the prescribed form setting forth the price(s) for the Work to be performed.

"Bidder" shall mean any person, firm, or corporation submitting a Bid for the Work.

"Bonds" shall mean Bid, Performance, and Payment Bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.

"Change Order" shall mean a written order to the Contractor authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time, as approved by the Town of Nags Head.

"Contract Documents" shall consist of Advertisement for Bids, Proposal, Bid Bond, Certificate of Corporate Bidder, Oath of Successful Bidder, Contract, Contract Performance Bond, Payment Bond, Instructions to Bidders, General Requirements, General Conditions, Supplementary Conditions, Technical Specifications, Certificates of Insurance, and Drawings. The intent of these documents is to include all materials, appliances, tools, labor, and services of every kind necessary for the proper execution of the Work, and the terms and conditions of payment therefore. The Contract Documents shall be considered as one, and whatever is called for by any one of them shall be as binding as if called for by all.

"Contract Price" shall mean the total monies payable to the Contractor under the terms and conditions of the Contract Documents.

"Contract Time" shall mean the number of calendar days stated in the Contract Documents for the completion of the Work.

"Contractor" or "General Contractor" shall mean the individual, firm, or corporation undertaking the execution of the Work as an independent contractor under the terms of the Contract and acting through his or its agents or employees.

"Town" shall mean Town of Nags Head.

"Drawings" shall mean the part of the Contract Documents, which show largely through graphical presentation the characteristics, design and scope of the Work to be performed and which have been prepared or approved by the Town.

"Effective Date of the Contract"—The date, indicated in the Agreement, on which the Contract becomes effective.

"Engineer / Architect"—The individual(s) or entity(s) named as such in the Agreement.

"Field Order" shall mean a written order effecting a change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by the Town to the Contractor during construction.

"Laws and Regulations; Laws or Regulations"—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

"Milestone"—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

"Notice of Award" shall mean the written notice of the acceptance of the Bid from the Town to the successful Bidder as evidenced by return receipts of registered or certified letters.

"Notice to Proceed" shall mean written communication issued by the Town to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work as evidenced by official receipt of certified mail or acknowledgement of personal delivery.

"Owner" shall mean Town of Nags Head.

"Project" shall mean the undertaking to be performed as provided in the Contract Documents.

"Project Coordinator" shall be the individual or individuals assigned to coordinate the project and insure that Town procedures are followed and the quality of work is up to the standards expected.

"Project Manual"—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

"Shall" is mandatory; "may" is permissive.

"Shop Drawings" shall mean all drawings, diagrams, illustrations, brochures, schedules, and other data, which are prepared by the Contractor, Subcontractor, manufacturer, Supplier, or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

"Specifications" shall mean a part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards, and workmanship specified for this Project.

"Subcontractor" shall mean an individual, firm, or corporation having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the site.

"Substantial Completion" shall mean that date determined by the Town when the construction of the Project or an expressly stipulated part thereof is sufficiently completed, in accordance with the Contract Documents, so the Project or stipulated part can be fully utilized for the purposes for which it is intended.

"Supplemental General Conditions" shall mean a part of the Contract Documents consisting of modifications or additions to the General Conditions.

"Superintendent" shall mean the Contractor's authorized on job representative designated in writing by the Contractor prior to commencement of any work

"Supplies" shall mean any person, supplier, or organization who furnishes materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

"Work" of the Contractor or Subcontractor shall include all labor, material, equipment, transportation, skill, tools, machinery, and other equipment and things useful or necessary in order to complete the Contract.

2. APPLICABLE REQUIREMENTS

The work shall comply with the Contract Documents and with all applicable codes, laws, and regulations of the Town, State, or Federal agencies. In the event of any conflict between the terms of this Contract and such codes, laws, and regulations, the codes, laws, and regulations shall prevail. If the Contractor performs any work contrary to such codes, laws, or regulations he shall assume full responsibility therefore and shall bear any and all costs necessary to correct the Work.

3. CONTRACT SECURITY

The Contractor shall furnish a Contract Performance Bond and a Payment Bond, each equal to one hundred percent (100%) of the Contract Price if the base bid price exceeds \$500,000. Bonds given shall meet the requirements of the law of the State of North Carolina including but not limited to G.S. 143-129. The surety on each Bond shall be a surety company satisfactory to the Town and duly authorized to do business in the State of North Carolina.

4. NOTICE AND SERVICE THEREOF

Any notice to Contractor from the Town relative to any part of this Contract shall be in writing and considered delivered and the service thereof completed, when said notice is posted by mail, to the said Contractor at his last given address or delivered in person to said Contractor or his authorized representative on the work site.

5. SPECIFICATIONS

The Specifications, the Drawings accompanying them, and the other Contract Documents, shall be supplementary to each other, and any material, workmanship, and/or service which may be in one, but not called for in the others, shall be as binding as if indicated, called for, or implied by all.

The General Contractor will be held responsible to furnish all labor and materials necessary to complete the Work as indicated by the Drawings and Specifications.

Unless otherwise stipulated, the General Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary for the execution and completion of the Work. He shall be responsible for the entire Work and every part thereof.

Each section or type of work is described separately in the Technical Specifications; however, should any item of material, equipment, work, or combinations of such be required in one section, and not be described in that section and a similar item described in another section, that description shall apply regardless of the section under which it is described.

6. DRAWINGS AND SPECIFICATIONS

The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental work necessary to complete the Project in an acceptable manner, ready for use, occupancy, or operation by the Town.

In case of conflict between the Drawings and Specifications, the specifications shall govern. Figure dimensions on Drawings shall govern over scale dimensions, and detailed drawings shall govern over general drawings.

If existing utilities or structures are indicated by the Contract Documents, no warranty is made as to the accuracy or completeness of such indication.

Any discrepancies found between the Drawings and Specifications and site conditions or any inconsistencies or ambiguities in the Drawings or Specifications shall be immediately reported to the Project Coordinator for the Town, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. Work done by the Contractor after his discovery of such discrepancies, inconsistencies, or ambiguities shall be done at the Contractor's risk.

The Project Coordinator for the Town may (without changing the scope of the Work) furnish the Contractor additional instructions and detail drawings, as necessary to carry out the Work required by the Contract Documents. The additional drawings and instructions thus supplied will become a part of the Contract Documents. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

Abriding: Attention is directed to the fact that the detailed Specifications and separate sections may be written in short or abridged form. The Contractor shall in regard to every section of the Specifications and Drawings of articles, materials, operations, or methods:

1. Provide each item mentioned and indicated, of quality or subject to qualifications noted.
2. Perform according to conditions stated, each operation prescribed.
3. Provide therefore all necessary labor, equipment and incidentals.

Wording: Whenever in these Specifications or on the Drawings the words "directed," "required," "permitted," "ordered," or words of like import are used, it shall be understood that the direction, requirement, permission or order of the Town is intended, and similar words, "approved," "acceptable," "satisfactory," or words of like import shall mean approved by, acceptable to, or satisfactory to the Town.

Specification Sections: For convenience of reference and to facilitate the letting of contracts and subcontracts, these Specifications are separated into titled sections. Such separation shall not, however, operate to make the Town an arbiter to establish limits to the contracts between the Contractor and Subcontractors, nor shall such separation be interpreted as superseding normal construction trade jurisdictions.

Language: Notwithstanding the appearance of such language in the various sections of the Specifications as, "The Paving Contractor," "The Grading Contractor," etc., the Contractor is responsible to the Town for the entire Contract and the execution of all work referred to in the Contract Documents.

7. PRESENT DOCUMENTS GOVERN

The Contractor shall in no case claim a waiver of any specification requirements on the basis of previous approval of material or workmanship on other jobs of like nature or on the basis of what might be considered "standard" for material or workmanship in any particular location. The Contract Documents for this job shall govern the Work.

8. CONTRACTOR'S SHOP DRAWINGS

The approved Drawings will be supplemented by such Shop Drawings as are needed to adequately control the Work. It is mutually agreed that all authorized alterations affecting the requirements and information given on the approved Drawings shall be in writing.

Shop Drawings to be furnished by the Contractor for any structure shall consist of such detailed drawings as may be required for the prosecution of the Work.

Shop Drawings must be approved by the Project Coordinator before the work in question is performed. Drawings for false work, centering, and formwork may also be required, and in such cases shall be likewise subjected to approval unless approval be waived. It is expressly understood, however, that approval of the Contractor's Shop Drawings does not relieve the Contractor of any responsibility for accuracy of dimensions and details. It is mutually agreed that the Contractor shall be responsible for agreement and conformity of his Shop Drawings with the approved Drawings and Specifications.

It is the responsibility of the Contractor to check all Shop Drawings before same are submitted to the Project Coordinator for approval. Shop Drawings that have not been checked and approved by the Contractor will not be approved.

Shop Drawings shall be submitted only by the Contractor who shall indicate by a signed stamp on the drawings that he has checked the Shop Drawings and that the work shown on them is in accordance with Contract requirements and has been checked for dimensions and relationship with work of all other trades involved. Under no conditions shall Shop Drawings be accepted from anyone other than the Contractor.

The Contractor shall furnish the Project Coordinator at least six copies of all Shop Drawings for approval. Two finally approved copies will be returned to the Contractor for his use.

The Contract Price shall include the cost of furnishing all Shop Drawings and the Contractor will be allowed no extra compensation for such drawings.

The approval of such Shop Drawings shall not relieve the Contractor from responsibility for deviations from Drawings or the Specifications unless he has in writing called attention to such deviations, and the Project Coordinator has approved the changes or deviations in writing at the time of submission, nor shall it relieve him from the responsibility for errors of any kind in Shop Drawings. When the Contractor does call such deviations to the attention of the Project Coordinator, he shall state in his letter whether or not such deviations involve any extra cost. If this is not mentioned, it will be assumed that no extra cost is involved for making the change.

9. INSTRUCTIONS, CHANGES, ETC.

All changes, alterations or instructions in regard to any feature of the Work that differ from the Drawings and Specifications must be approved in writing by Change Order in all cases, and no verbal orders will be regarded as a basis for claims for extra work.

If the Contractor claims that any instruction by Drawings or otherwise involves extra cost or an extension of time, he shall notify the Project Coordinator in writing within ten days after the receipt of such instructions and in any event before proceeding to execute the Work. Thereafter, the procedure shall be the same as that described for changes in the Work. No such claim shall be valid unless made in accordance with the terms of this section.

No claims for extra cost will be considered based on an escalation of material prices throughout the period of the Contract.

No extra work is to be performed or any change made that involves any extra cost or extension of time unless approved by the Town Council of Nags Head and authorized by Change Order.

10. EXAMINATION OF WORK BY CONTRACTOR

It is understood and agreed that the Contractor, has by careful examination, satisfied himself as to the nature and location of the Work, the conformation of the ground, the character, quality, and quantity of the facilities needed preliminary to and during the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work or the cost thereof under this Contract. No verbal agreement or conversation with any officer, agent, or employee of the Town, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations herein contained.

11. MATERIALS, SERVICES AND FACILITIES

The Contractor shall at all times employ sufficient labor and equipment for prosecuting the Work to full completion in the manner and time specified. Failure of the Contractor to provide adequate labor and equipment may result in default of the Contract. The labor and equipment to be used in the Work by the

Contractor shall be sufficient to meet the requirements of the Work and shall be such as to produce a satisfactory quality of work, in accordance with accepted industry practices within the time specified in the Contract.

Materials and equipment shall be so stored and handled as to insure the preservation of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection. No product that has in any way become unfit for the intended purpose shall be incorporated into the Work.

Manufactured articles, materials and equipment shall be applied, installed, connected, erected, cleaned, and conditioned as directed by the manufacturer.

Materials, supplies, and equipment to be incorporated into the Work shall be new and unused unless otherwise specifically stated in the Contract Documents. The source of supply for all such products shall be submitted to the Project Coordinator, together with detailed descriptions thereof in the form of samples, Shop Drawings, tests, or other means necessary to adequately describe the items proposed. If, after trial, it is found that sources of supply, even though previously approved by the Project Coordinator, have not furnished products meeting the intent of the Contract Documents, the Contractor shall thereafter furnish products from other approved sources, and shall remove completed Work incorporating products which do not meet Contract requirements.

12. "OR EQUAL" CLAUSE

Whenever a material or article required is specified or shown on the Drawings and/or Specifications by using the name of the proprietary product or of a particular manufacturer or vendor, it is intended to denote the quality standard of the article desired, but does not restrict Contractors to the specific brand, make, or manufacturer so named. Any material or article that will perform adequately the duties imposed by the general design may be considered equal and satisfactory providing the material or article so proposed is of equal substance and function. The opinion of the Project Coordinator shall be final and no substitute material or article shall be purchased or installed without such written approval.

13. INSPECTION AND TESTING OF MATERIALS

Unless otherwise specifically provided for, the inspection and testing of materials and finished articles to be incorporated in the Work at the site shall be made by bureaus, laboratories, or agencies approved by the Project Coordinator. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Section 14. The contractor shall furnish evidence satisfactory to the Project Coordinator that the material and finished articles have passed the required tests prior to the incorporation of such materials and finished articles in the Work.

14. INSPECTION OF WORK

The Contractor shall, at all times, permit and facilitate inspection of the Work by authorized representatives of the Town and public authorities having jurisdiction in connection with the Work of this Contract. The presence or observations of the Project Coordinator or other Town representatives at the site of the Work shall not be construed to, in any manner, relieve the Contractor of the responsibility for strict compliance with the provisions of the Contract Documents.

If the Specifications, Town's instructions, laws, ordinances, or a public authority require any work to be specially tested or approved, the Contractor shall give the Project Coordinator timely notice of its readiness for observation or inspection. If the inspection is by another authority, then the Project Coordinator shall be advised of the date fixed for such inspection. Required certificates of inspection shall be secured by the Contractor. Contractor having secured all certificates of inspection will deliver same to the Project Coordinator upon completion. If any work should be covered up without approval or consent of the Project Coordinator, it shall, if required by the Project Coordinator, be uncovered for examination at the Contractor's expense. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others)

Should any disagreement or difference arise as to the estimate, quantities or classifications or as to the meaning of the Drawings or Specifications, or any point concerning the character, acceptability, and nature of the several kinds of work, any materials and construction thereof, the decisions of the Project Coordinator shall be final and conclusive and binding upon all parties to the Contract.

15. AUTHORITY OF THE TOWN OF NAGS HEAD

The Contractor shall perform all of the Work herein specified under the general direction, and to the entire satisfaction, approval, and acceptance of the Project Coordinator. The Project Coordinator shall decide all questions relating to measurements of quantities; the character of the Work performed and as to whether the rate of progress is such that the Work will be completed within the time limit of the Contract. All questions as to the meaning of these Specifications will be decided by the Project Coordinator.

The approval of the Project Coordinator of any materials, plants, equipment, Drawings, or of any other items executed, or proposed by the Contractor shall be construed only to constitute an approval of general design. Such approval shall not relieve the Contractor from the performance of the Work in accordance with the Contract Documents, or from any duty, obligations, performance guarantee, or other liability imposed upon him.

16. PROHIBITED INTERESTS

No official of the Town who is authorized in such capacity and on behalf of the Town to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction, or material supply contract, or any subcontract in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, engineer, or inspector of or for the Town who is authorized in such capacity by the Town and on behalf of the Town to exercise any legislative, executive, supervisory, or other similar functions in connection with the construction of the Project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the Project.

17. REJECTIONS OF WORK AND MATERIALS

All materials and equipment furnished and all work done that is not in accordance with the Drawings or Specifications or that is defective will be rejected. All rejected materials, equipment, or work shall be removed immediately. If rejected materials, equipment, or work is not removed within forty-eight hours from the date of letter of notification, the Project Coordinator shall have the right and authority to stop the Contractor and his work immediately, and/or shall have the right to arrange for the removal of said rejected materials, equipment, or work at the cost and expense of the Contractor. All rejected materials, equipment,

or work shall be replaced with other material, equipment, or work that conforms with the Drawings and Specifications at no additional cost to the Town.

Inspection of the Work shall not relieve the Contractor of any of his obligations to fulfill his Contract and defective work shall be made good regardless of whether such work, material, or equipment has been previously inspected by the Project Coordinator and accepted or estimated for payment. The failure of the Project Coordinator to condemn improper materials or workmanship shall not be considered as a waiver of any defect, which may be discovered later, or for work actually defective. All work, material, and/or equipment shall be guaranteed against defects for a period of one year from date of Project acceptance as established by the Town.

18. WEATHER CONDITIONS

The Contractor will be required to protect all work and materials against damage or injury from the weather. If, in the opinion of the Project Coordinator, any work or materials shall have been damaged or injured by reason of failure to protect such, all such materials or work shall be removed and replaced at the expense of the Contractor.

19. ROYALTIES AND PATENTS

The Contractor shall hold and save the Town and its officers, agents, servants, and employees, harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the Town, unless otherwise specifically stipulated in the Contract Documents.

20. CONTRACTOR'S PERSONNEL

The Contractor will supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences, and procedures of construction. An experienced Superintendent and necessary assistants competent to supervise the particular types of work involved shall be assigned to the Project by the Contractor, and shall be available at all times when work is in progress. The name of the Superintendent shall be submitted with qualifications of same prior to start of the Work and shall be approved by the Project Coordinator prior to start of the Work. The Superintendent so named by the Contractor shall be employed by the Contractor and shall have served in a supervisory capacity on at least one Project of like description and size performed by the Contractor during the previous twelve months. Under no circumstances shall an employee of any Subcontractor serve as Project Superintendent. The Superintendent shall represent the Contractor, and all directions given to the Superintendent shall be as binding as if given to the Contractor.

Only persons skilled in the type of work that they are to perform shall be employed. The Contractor shall, at all times, maintain discipline and good order among his employees, and shall not employ on the Work any unfit person or persons or anyone unskilled in the work assigned him. The Contractor shall insure that all employees maintain proper respect and courtesy for the "Public" on the project site or in adjacent off site areas.

21. LINES, GRADES AND MEASUREMENTS

Such stakes and markings as the Project Coordinator may set for either its or the Contractor's guidance shall be preserved by the Contractor. Failure to protect such stakes or markings, or gross negligence on the Contractor's part resulting in loss of same, may result in the Contractor being charged for their replacement.

The Contractor must exercise proper care and caution to verify the grades and figures given him before proceeding with the Work, and shall be responsible for any damage or defective work caused by his failure of such care and caution. He shall promptly notify the Project Coordinator of any errors or discrepancies he may discover in order that the proper corrections may be made.

22. PERMITS AND LICENSES

Owner shall pay all governmental permit charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work. All other permits, licenses, fees of a temporary nature necessary for the prosecution of the Work, shall be secured and paid for by the Contractor

23. LAWS AND REGULATIONS

The Contractor's attention is directed to the fact that all applicable Federal, State, and Town laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout, and they will be deemed to be included in the Contract Documents the same as though herein written out in full. The Contractor shall keep himself fully informed of all laws, ordinances, and regulations of the Federal, State, and Town in any manner affecting those engaged or employed in the Work or the materials used in the Work or in any way affecting the conduct of the Work and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over same. If any discrepancy or inconsistency should be discovered in this Contract, or in the Drawings or Specifications herein referred to, in relation to any such law, regulation, ordinance, order, or decree, he shall herewith report the same, in writing, to the Project Coordinator. He shall at all times himself observe and comply with all such laws, ordinances, and regulations, and shall protect and indemnify the Town and its agents against any such law, ordinance, regulation, order, or decree, whether by himself or by his employees.

In consideration of the signing of this contract, the parties hereto for themselves, their agents, officials, employees and servants agree not to discriminate in any manner on the basis of race, color, creed, national origin, sex, age, handicap, or sexual orientation with reference to the subject matter of this contract, no matter how remote. The parties further agree in all respects to conform with the provisions and intent to Town of Nags Head Code of Ordinances, as amended. This provision is hereby incorporated into this contract for the benefit of the Town of Nags Head and its residents, and may be enforced by action for specific performance, injunctive relief, or other remedy as by law provided. This provision shall be binding on the successors and assigns of the parties with reference to the subject matter of this contract.

24. CONTRACTOR'S OBLIGATIONS

The Contractor shall, in good workmanlike manner, do and perform all work and furnish all supplies and materials, machinery, equipment, facilities, and means, except as herein otherwise expressly specified, necessary, or proper to perform and complete all the Work required by this Contract, within the time herein specified, in accordance with the provisions of this Contract and said Specifications and in accordance with the Drawings of the Work covered by this Contract and any and all supplemental drawings of the Work covered by this Contract. He shall furnish, erect, maintain, and remove such construction, plants, and such temporary works as may be required. He alone shall be responsible for the safety, efficiency, and adequacy of his plants, appliances, and methods, and for any damage, which may result from their failure or their improper construction, maintenance, or operation. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract and Specifications, local ordinances, and State and Federal laws; and shall do, carry on, and complete the entire Work.

25. SUBCONTRACTING

The Contractor understands and agrees that it shall be a breach of this Contract to subcontract any portion of the Work on this Project unless the Work and the contractor proposed to perform it have been declared in the Proposal to the Contract; or the Contractor shall have obtained written approval from the Town for the change in subcontractor.

THE CONTRACTOR FURTHER UNDERSTANDS AND AGREES THAT ANY WORK ON THIS PROJECT WHICH THE CONTRACTOR SECURES IN VIOLATION OF THIS PROVISION SHALL BE DEEMED A GRATUITY FROM THE CONTRACTOR FOR WHICH THE TOWN OF NAGS HEAD SHALL NOT BE OBLIGATED TO PAY. ALSO, THAT ANY WORK DONE BY THE SUBCONTRACTOR AND NOT MEETING THE SPECIFICATIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPLACE AT HIS OWN COST.

Nothing contained in this Contract shall create any contractual relation between any Subcontractor and the Town.

26. ASSIGNMENTS

The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Town.

27. CONTRACTOR'S HOLD HARMLESS AGREEMENT

The Contractor hereby releases and forever discharges the Town, its officers, agents and employees, from any and all claims, demands, expenses, costs and liabilities of any kind or nature directly or indirectly related to any personal injury and/or property damage arising out of the performance of the work, except those claims that result from the sole negligence of the Town or a Town employee acting within the scope of the employment. The Contractor shall indemnify, defend and hold harmless the Town, its agents and employees from and against any and all claims, demands expenses, costs and liabilities of any kind or nature, directly or indirectly caused by, arising out of, or related to the intentional, negligent or reckless acts or omissions of the Contractor, and its agents or employees, in the performance of the work.

28. INSURANCE REQUIREMENTS

The Contractor shall furnish the following along with Bonds and Contract Documents sent to the Town for execution:

- A. Certificates of Insurance from companies doing business in North Carolina and acceptable to the Town covering:

1. Workers' Compensation Insurance:

With limit of no less than \$1,000,000 each accident, each employee and policy limit.

2. Commercial General Liability Insurance:

Combined single limits of no less than \$1,000,000 each occurrence and \$2,000,000 aggregate. This insurance shall include Comprehensive Broad Form Coverage including contractual liability. 'Town of Nags Head is named additional insured as their interests may appear' must be endorsed onto policy and listed on Certificate of Insurance.

3. Commercial Automobile Liability Insurance:

Limits of no less than \$1,000,000 Combined Single Limit. Evidence of commercial automobile coverage is only necessary if vehicles are used in the provision of services under this Agreement and/or are brought on a Town of Nags Head site. 'Town of Nags Head is named additional insured as their interests may appear' must be endorsed onto policy and listed on Certificate of Insurance.

B. Certificates of Insurance must be executed in accordance with the following provisions:

1. Certificates to contain policy number, policy limits and policy expiration date of all policies issued in accordance with this Contract;
2. Certificates to contain the location and operations to which the insurance applies;
3. Certificates to contain a specific statement that blasting coverage is included to the extent to which such risk is present;
4. Certificates to contain Contractor's protective coverage for any Subcontractor's operations;
5. Certificates to contain Contractor's contractual insurance coverage.
6. Certificates are to be issued to:

Town of Nags Head
P.O. Box 99
Nags Head, NC 27959
FOR: DOWDY PARK

7. Certificates referred to in 6 above must be mailed to:

Town of Nags Head
P.O. Box 99
Nags Head, NC 27559
FOR: DOWDY PARK

- C. The Contractor shall be wholly responsible for securing certificates of insurance coverage as set forth above from all Subcontractors who are engaged in this Work.

29. LAND AND RIGHTS-OF-WAY

Prior to entering on any land or right-of-way, the Contractor shall ascertain the requirements of applicable permits or easements secured by the Town or required of the Contractor, and shall conduct his work in accordance with requirements thereof including the giving of notice.

The Contractor shall provide at his own expense and without liability to the Town any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

30. PROTECTION OF WORK, PROPERTY AND PERSONS

The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, lakes, drainage ways, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the Work, all necessary warning safeguards for devices and safety and protection of the Work, the public, and adjoining property. He will notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

The Contractor shall, prior to commencing other on-site work, accurately locate above and below ground utilities and structures, which may be affected by the Work, using whatever means may be appropriate. The Contractor shall mark the location of existing utilities and structures, not otherwise readily visible, with flagging, stakes, barricades, or other suitable means, and shall preserve and protect all utilities and placement in the course of construction. He shall notify the Project Coordinator promptly on discovery of any conflict between the Contract Documents and any existing facility.

In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, or unanticipated conditions where delay would substantially impact the time or cost of work, the Contractor, upon notification to the Project Coordinator, shall act to prevent threatened damage, injury, or loss. Any claim for compensation or extension of time by the Contractor due to such extra work shall be submitted to the Project Coordinator within ten (10) days of the date of performing such work or deviations in the manner prescribed for a Change Order.

All existing utilities, both public and private, including sewer, gas, water, electrical, and telephone services, etc., shall be protected and their operation shall be maintained through the course of the Work. Any temporary shutdown of an existing service shall be arranged between the Contractor and the utility responsible and hold the Town harmless from the result of any damage that may occur as a result of the Contractor's activities.

The Contractor will not stage equipment or materials within the drip line of any existing trees within the project site, nor shall they trench, excavate, or otherwise move earth under the drip line of any trees within the project area.

31. PRIOR USE BY TOWN

Prior to completion of the Work, the Town may take over operation and/or use of the uncompleted Project or portions thereof. The Contractor must agree to the prior use, and it must not prevent the Contractor from completing the work. Such prior use of facilities by the Town shall not be deemed as acceptance of any work or relieve the Contractor from any of the requirements of the Contract Documents.

Where the Town has beneficial occupancy of a usable facility prior to the expiration of the specified Contract Time, but where contract work items remain outstanding, the Town, at its option, may, in lieu of all or a proportion of liquidated damages owed by the Contractor, charge the Contractor for actual cost of administering the Contract for a period subsequent to expiration of the Contract completion date (not to exceed the total amount which could be assessed under liquidated damages).

32. CLEANING UP

The Contractor shall at all times keep the premises free from accumulation of waste materials or rubbish caused by Contractor's employees or work. Upon completion of the Work, the Contractor shall remove all his equipment, tools, materials, and other articles from the property of the Town.

33. BARRICADES

Lanterns: Contractor shall provide continuously burning lanterns at all barricades and at protective barriers around excavations so that the public is adequately warned of such hazards. Lanterns shall remain lighted from sundown to sunrise and at all other times when the labor forces are not on the job site.

Access to Site: Delivery of construction materials and equipment shall be only from locations approved by the Town.

34. CHANGES IN THE WORK

The Town may at any time, as the need arises, order changes within the scope of the Work without invalidating the agreement. If such changes increase or decrease the amount due under the Contract Documents, or in the time required for performance of the Work, an adjustment may be authorized by Change Order.

The Project Coordinator, also, may at any time, make changes in the details of the Work. The Contractor shall proceed with the performance of any changes in the Work so ordered by the Project Coordinator unless the Contractor believes that such change entitles him to a change in Contract Price or Time, or both, in which event he shall give the Project Coordinator written notice thereof within five days after the receipt of the ordered change, and the Contractor shall not execute such changes pending the receipt of an executed Change Order or further instruction from the Town or the Project Coordinator.

The Contract Price may be changed only by a Change Order. The value of any work covered by a Change Order or of any claim for increase or decrease in the Contract Price shall be determined by one or more of the following methods in the order of precedence listed below:

- A. Unit prices previously approved.
- B. An agreed lump sum.

- C. The actual cost for labor, direct overhead, materials, supplies equipment, and other services necessary to complete the Work. In addition there shall be added an amount agreed upon but not to exceed fifteen percent of the actual cost of such work to cover the cost of general overhead and profit.

35. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

It is hereby understood and mutually agreed, by and between the Contractor and the Town, that the date of beginning, rate of progress and the time for completion of the Work are essential conditions of this Contract; and it is further mutually understood and agreed that the Work embraced in this Contract shall be commenced on a date to be specified in the Notice to Proceed.

The Contractor agrees that said work shall be prosecuted regularly, diligently and uninterrupted at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Town, that the time for the completion of the Work described herein is a reasonable time for the completion of the same, taking into consideration the average climate range prevailing in this locality.

If the said Contractor shall neglect, fail or refuse to complete the Work within the time herein specified, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Town, the amount specified herein, not as a penalty, but as liquidated damages.

It is further agreed that time is of the essence of each and every portion of this Contract and of the Specifications wherein a definite portion and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be the essence of this Contract. Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the Work is due to unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or to the public enemy, acts of the Town, acts of another contractor in the performance of a contract with the Town, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather exceeding the average climatic conditions in that area of the Work.

Provided further, that the Contractor shall within ten days from the beginning of such delay, notify the Town, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of its decision in the matter.

36. PAYMENTS TO CONTRACTOR

Cost Breakdown - The Contractor shall be prepared to submit a cost breakdown immediately after the opening of Bids. Cost breakdown shall be based on values of parts of the Work as divided according to sections of the Specifications, and shall be further subdivided into labor and materials. The Contractor shall use the AIA G702 & G703 or EJDC C-620 Forms for cost breakdown and all payment requests.

Materials and Work Covered by Partial Payments - All materials and work covered by progress payments shall, upon payment thereof, become the sole property of the Town, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made, or the restoration of any damaged work.

37. SCHEDULES, REPORTS AND RECORDS

The Contractor shall submit to the Project Coordinator such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records, and other data as the Project Coordinator may request concerning work performed or to be performed.

The Contractor shall submit schedules showing the order in which he proposes to carry on the Work, including dates at which he will start the various parts of the Work, estimated date of completion of each part; and, as applicable, the dates at which special detail drawings will be required, and respective dates for submission of Shop Drawings, the beginning of manufacture, the testing and the installation of materials, supplies and equipment. The basic project schedule shall be submitted at the preconstruction meeting and no partial payments shall be made until it has been submitted to the Town.

The Contractor shall also submit a schedule of payments that he anticipates he will earn during the course of the Work.

38. TOWN'S RIGHT TO SUSPEND OR TERMINATE WORK

If the Contractor is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the Contractor or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workers, or suitable materials or equipment, payments to Subcontractors or for labor, materials or equipment, or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the Work, or if he otherwise violates any provision of the Contract Documents, then the Town may, without prejudice to any other right or remedy and after giving the Contractor and his surety a maximum of seven days from delivery of a written notice, declare the Contract in default, take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, and call upon the surety to finish the Work by whatever method deemed expedient.

39. ACCEPTANCE OF WORK AND FINAL PAYMENT

Before final acceptance of the Work and payment to the Contractor of the percentage retained by the Town, the following requirements shall be complied with:

- A. Final Inspection: Upon notice from the Contractor that his work is completed, the Project Coordinator shall make a final inspection of the Work, and shall notify the Contractor of all instances where his work fails to comply with the Drawings and Specifications, as well as any defects he may discover. The Contractor shall immediately make such alterations as are necessary to make the Work comply with the Drawings and Specifications.
- B. Final Payment: When the Work under this Contract is completed, a final payment request shall be submitted representing the original Contract Price and Change Orders to the Contract. The final payment shall not be due until the Contractor shall have completed all work necessary and reasonably incidental to the Contract, including final clean up.

Acceptance of the Work and the making of final payment shall not constitute a waiver of any claims by the Town. Payments otherwise due the Contractor may be withheld by the Town because of defective work not remedied and unadjusted damage to others by the Contractor or Subcontractors, vendors or laborers.

All claims for final payment must be submitted within 60 days after the Work has been completed and accepted by the Town. Failure to present said claims within that period shall constitute a waiver of the claim by the Contractor. All claims are subject to final approval and audit by the Town of Nags Head.

40. GUARANTEE AND CORRECTION OF WORK

The Contractor shall guarantee all work to have been accomplished in conformance with the Contract Documents. Neither the final certificate of payment nor any provision of the Contract Documents, nor partial or entire occupancy or use of the Work by the Town, shall constitute an acceptance of any part of the Work not done in accordance with the Contract Documents, or relieve the Contractor of liability for incomplete or faulty materials or workmanship. The Contractor shall promptly remedy any omission or defect in the Work and pay for any damage to other improvements or facilities resulting from such omission or defect which shall appear within a period of ONE year from the date of final acceptance, unless a longer period is elsewhere specified. In the event that the Contractor should fail to make repairs, adjustments or other remedy that may be made necessary by such defects, the Town may do so and charge the Contractor the cost thereby incurred. The performance Bond shall remain in full force and effect through the guarantee period.

41. VENUE

The law of the State of North Carolina shall govern the construction of this Contract. The courts of Dare County, North Carolina shall have exclusive jurisdiction to try disputes arising under or by virtue of this Contract.

SUPPLEMENTAL GENERAL CONDITIONS

SCOPE

Furnish, erect, and maintain temporary facilities and perform temporary work required in the performance of this Contract, including those shown and specified.

USE OF TEMPORARY FACILITIES

(Contractor's option provided OSHA requirements and Town Code Requirements are met)

Contractor may be required by the Town to provide and maintain a suitable temporary office on the site for his own use and for the use of representatives of the Town.

MAINTENANCE AND REMOVAL

(Contractor's option provided OSHA requirements and Town Code Requirements are met)

- A. Utilities and Furnishings: Contractor shall furnish sufficient heat, artificial light, ventilation and janitor's service, and shall also provide a table or desk, plan rack and chairs, all for the use of those visiting the job, in addition to such furnishings as he provides for his own use.
- B. Location and Removal: Temporary offices and other structures shall be located where approved by Town, and shall be removed from the premises upon completion of the Contract or earlier if so directed by the Town. They shall remain the property of the Contractor.

FIELD OFFICES

(Contractor's option provided OSHA requirements and Town Code Requirements are met)

Contractor and his Subcontractors shall provide such additional offices, storage shanties, tool sheds and other temporary buildings as required for their own use and those employed on the Work. Any materials stored outside of these storage buildings or vehicles shall be inside a fenced and locked space constructed for temporary storage.

TOILET AND WASHING FACILITIES

(Contractor's option provided OSHA requirements and Town Code Requirements are met)

- A. Toilet Building: Contractor may be required by the Town, at the beginning of work, to provide on premises suitable and adequate temporary toilets and enclosure for use of workers on the job; maintain same in sanitary condition; remove same at completion of building operations and/or when directed.
- B. Sanitary Regulations: Do not allow any sanitary nuisances to be committed in or about work, enforce sanitary regulations of local and State Health Authorities.

UTILITIES DURING CONSTRUCTION

- A. Utilities: Contractor shall furnish all utilities and pay for all utility bills used during construction. Utilities shall include electric power or fuel of any sort used for heating, etc., and water.
- B. Connections to Utilities: Contractor shall provide all temporary connections to utilities when not provided by utility company or others.

TELEPHONE

(Contractor's option provided OSHA requirements and Town Code Requirements are met)

Contractor shall, if required by the Town, install and maintain at his own expense, a job telephone for duration of the Contract.

TEMPORARY HEAT

The Contractor shall provide at his own expense temporary heat as necessary to protect all work and materials against injury from dampness and cold. Fuel, equipment and method of heating shall not present a fire hazard and shall be satisfactory to the Town. See requirements in detail Specifications for temperatures to be maintained for application of work under the various trades.

ON PROJECT LABOR FORCE

The Contractor shall, at his own expense, provide the employees on the job with identifiable uniforms, name tags or other identification to indicate the name of the firm for which the employee is working while on the project.

SITE CONDITIONS

The Contractor shall provide a safe site work area at all times. Any holes are to be properly protected from access by children or others when the workers are not on the job site. All areas of potential hazard shall be fenced, barricaded, or appropriately marked with other devices to insure adequate notice is provided to the facility users of potential danger. All equipment shall be locked or otherwise protected to prevent the equipment from being started by people other than the work force when the job site is vacated. All hazardous materials shall be kept under lock while on the job site except when in use. The storage of all such hazardous materials shall be in a protected area and the materials stored shall be properly posted on the trailer, fence, or other device used to secure the materials.

The Contractor shall be responsible for the safe condition of the site from the initiation of work until final inspection of the project. During the time period of the project all materials, equipment, tools and other items brought to the site shall be secured if not installed, kept in neat orderly, safe stacks or piles, fenced or properly marked with warning tape or other manner to prevent users of the facilities from harm or injury. The Contractor shall not leave any excavation, hole, or pit on the project unsecured. All holes, excavations, or pits shall be covered, fenced or adequately protected and secured to prevent children or others from accessing them.

CONTRACTOR RESPONSIBILITY

The Contractor shall provide to the Town a Project Schedule Timeline containing a break down of all the major work elements and when they will be installed. This shall be provided to the Town prior to commencing work.

The Contractor shall be responsible for all layout work needed to properly execute this project.

The Contractor shall be responsible for all permits, testing, layout, and inspections required prior to the release of the project to the Town. The Contractor shall provide proof of testing to the Town of those areas identified to be tested or specifically requested to be tested in the specifications.

PRODUCT INFORMATION/SHOP DRAWINGS:

The Contractor shall provide shop drawings or manufacturer product reference information for all equipment.

CHANGES/ADDENDA:

The Contractor shall submit any addenda and interpretation questions to the Owner prior to making the changes in the work. The submittal shall contain any explanation needed or description of the item in question. The submittal shall also include any price changes either credits or debits. The submittal shall also contain any time delays related to the item or items in question.

PROJECT TIME & DAMAGES:

Time of Completion and Liquidated Damages:

The Contractor shall commence work to be performed under this agreement on a date to be specified in writing from the Town and shall fully complete all work hereunder within the allotted Consecutive Calendar Days indicated on the bid form from the said date. For each day in excess of the contract number of days, the contractor shall pay the owner the sum in accordance with the schedule provided below as liquidated damages (per day) reasonably estimated and agreed upon with the signing of the contract. The liquidated damages are to cover any losses incurred by the Owner by reason of the failure of the Contractor to complete the work within the time specified such time being the essence of this contract and a material consideration thereof.

Time Delay and Extensions:

The Contractor shall notify his surety in writing of any granted extensions of the Contract Time.

No claim shall be allowed because of the failure to furnish drawings or instructions until fifteen (15) days after written request for such drawings or instructions is made, and not then unless such claim is reasonable. Such action does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

Any request for extension of time shall be made within ten (10) days following the occurrence of the cause for the delay and shall be in writing to the Town: otherwise, any claim shall be waived. In case of a continuing delay, only one claim is necessary. When such request for extension is made, the Contractor shall provide an estimate of the probable effect of such delay on the progress of the work.

Bad Weather Allowance for Time in the Contract:

- A. The time for completion as stated above includes an allowance for bad weather days based on climatological data and is adjusted to reflect the number of working days per month, which would be affected. Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity and frequency.
- B. Owner and Contractor agree that the determination of "normal" intensity and frequency of weather events can be a difficult process. In lieu of any attempt to determine same through records or opinions of some weather agency, Owner and Contractor, by their having signed the Construction Contract agreement for this Project mutually agree that a number of calendar days equal to 10% of the Contract Time shall represent the number of days during which work is not feasible (Bad Weather Days) during "normal conditions". Only Bad Weather Days in excess of said 10% shall be a valid basis for claim for extension of the Contract Time. The following procedures shall be followed:
 - 1. Days on which precipitation exceeds 0.25 inch or lasting more than 2 hours
 - 2. Days on which the temperature fails to exceed 40 degrees F average.
 - 3. Excessively wet jobsite conditions due to heavy rain the previous day or night.
 - 4. Other extreme and dangerous weather, such as heat 100° F or above, nearby lightning, etc.

5. Flooding or other effects of tropical storm, hurricane or nor'easter.
 6. Any weather or other event giving rise to a declaration of a State of Emergency by the Town Manager or other public official in the jurisdiction of the jobsite.
 7. No Bad Weather Day will be approved during which the Contractor actually carries out production operations for at least 6 hours.
- C. Once each week during the Contract Time, Contractor shall notify Engineer/Architect of any Bad Weather Day(s) occurring during the previous week. Should Contractor fail to so notify Engineer within ten (10) calendar days after any such Bad Weather Day, Engineer may refuse to accept such day. Owner and Contractor agree that this shall be an ongoing process, while events are fresh in everyone's minds, and in no case shall the determination of Bad Weather Days be done retrospectively at the end of the project.
 - D. Engineer/Architect/Contractor shall keep a running record of Bad Weather Days, on an individual day basis, noting the type of condition which prevented work. If Engineer disagrees with Contractor that conditions on a given day were unsuitable for work, he shall promptly advise Contractor of such opinion.
 - E. After the cumulative number of Bad Weather Days exceeds the said 10% of the Contract Time, each excess day (except as provided below) shall be the basis of a claim for one day's extension of the Contract Time.
 - F. A similar procedure shall be employed for the period allowed for taking the Project from Substantial Completion to Full Completion.
 - G. Bad Weather Day conditions occurring on a Sunday, Holiday or where work was not scheduled, as defined herein, shall not be counted toward the 10%. Nor shall any excess day where Bad Weather Day conditions exist be a basis for extension of time if that day is a Sunday or Holiday.
 - H. The Town shall be the judge as to division of responsibility between the several contractors and shall apportion the amount of liquidated damages to be paid by each of them according to delay caused by any or all of them. This will relate to the construction schedules filed for the project by each contractor.
 - I. The bad weather days and any time extension shall be based on the "Local Climatological Data Sheets" compiled and published by the National Weather Center at Manteo Airport and on daily weather logs kept on the job by the Contractor reflecting the effect of the weather on progress of the work at the site. All data supporting a request for extension of time shall be supplied by the General Contractor or the project expediter assigned to the project.

Failure or Delay in Completing Work on Time:

- A. Time is an essential element of the Contract, and any delay in the prosecution of the work may inconvenience the public or interfere with the daily operations of the department and demand additional time for supervision. For this reason, it is important that the work be pressed vigorously to completion. Should the Contractor fail to complete the work within the time stipulated in the contract or within such extra time that may be allowed, charges shall be assessed against any money due or that may become due the Contractor in accordance with the Agreement.

Application of Damages:

- A. Liquidated damages shall start in accordance with the above schedule upon notification to the Contractor in writing that the apparent Contract Time has been consumed.

- B. Deduction from Partial Payments: Liquidated damages, as they accrue, will be deducted from periodic payments, such deductions shall be in addition to the retainage provided for the Contract.
- C. Deduction from Final Payment: The full amount of liquidated damages will be deducted from the final payment to the Contractor and /or his Surety.
- D. No liquidated damages charged for delay by the Town: In case of default of the Contract and the subsequent completion of the Work by the Town as hereinafter provided, the Contractor and his Surety shall be liable for the liquidated damages under the Contract, but no liquidated damages shall be chargeable for any delay in the final completion of the Work by the Town due to any unreasonable action, negligence, omission or delay of the Town. In any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount shall be presumed. The liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.
- E. The Contractor shall be liable for and shall pay to the Town the above stated amount as fixed, agreed and liquidated damages for each day beyond the designated completion date until the project is completed and accepted.

SPECIFICATIONS AND NON-CONFORMING WORK:

The Contractor shall follow the procedures outlined in the specification, manufacturer's technical data, or industry standards to provide a complete and proper finished product. Failure to do so in the view of the owner shall require the Contractor to remove the substandard work at no cost to the Town and redo the work until it meets the above stated requirements.

RECORD DOCUMENTS

Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer / Architect for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer / Architect.

SAFETY AND PROTECTION

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility

owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

- C. All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer / Architect or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer / Architect has issued a notice to Owner and Contractor that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- E. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

COMMENCEMENT AND PROGRESS OF WORK

- A. Commencement of Contract Times; Notice to Proceed: The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.
- B. Starting the Work: Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.
- C. Reference Points: Owner shall provide engineering surveys to establish reference points for construction which in Engineer / Architect's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer / Architect whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.
- D. Progress Schedule: Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer / Architect for acceptance proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted.
- E. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes

or disagreements, or during any appeal process, or as Owner and Contractor may otherwise agree in writing.

- F. Delay in Contractor's Progress: If Owner, Engineer / Architect, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
1. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
 2. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - a. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - b. abnormal weather conditions;
 - c. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner); and
 - d. acts of war or terrorism.
- G. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions.
- H. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- I. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

PRELIMINARY MATTERS

Delivery of Bonds and Evidence of Insurance

1. Bonds: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
2. Evidence of Contractor's Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named

insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor.

Copies of Documents

1. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
2. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer / Architect and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer / Architect.

Before Starting Construction

1. Preliminary Schedules: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer / Architect for timely review:
2. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
3. a preliminary Schedule of Submittals; and
4. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

Preconstruction Conference; Designation of Authorized Representatives

1. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer / Architect, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
2. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

Initial Acceptance of Schedules

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer / Architect, and others as appropriate, will be held to review for acceptability to Engineer / Architect as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer / Architect.

1. The Progress Schedule will be acceptable to Engineer / Architect if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer / Architect responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
2. Contractor's Schedule of Submittals will be acceptable to Engineer / Architect if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer / Architect as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

Electronic Transmittals

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer / Architect, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer / Architect, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

DISPUTE RESOLUTION

- A. Methods and Procedures
 1. Disputes Subject to Final Resolution: The following disputed matters are subject to final resolution under the provisions of Rules for Implementing Mediated Settlement in North Carolina Public Construction Projects, adopted February 26, 2002 and in accordance with N.C.G.S 143-128(g), 143-135.26(11):
 2. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 3. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
 4. Final Resolution of Disputes: For any dispute subject to resolution under this Article, Owner or Contractor may:
 - a. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 - b. agree with the other party to submit the dispute to another dispute resolution process; or
 - c. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

TAXES

Contractor and his Subcontractors shall maintain accurate records of payment of N.C. State Sales Tax on materials, supplies, fixtures, and equipment, which become a part of the Work. Contractor shall submit with the Application for Payment a certified statement showing sales tax paid by Contractor and Subcontractors. Certified statement shall list suppliers' invoices showing invoice number, amount paid, tax paid, date and county paid. Sales tax records and certified statements shall be in such form and substance as to meet the requirements of the NC State Department of Revenue in the matter of the Owner obtaining a refund from the State of North Carolina of sales taxes paid by Contractor and his Subcontractors.

CONSTRUCTION STAKEOUT / SURVEY CONSTRUCTION RECORD

Construction Stakeout- The Town of Nags Head will provide Construction Stakeout Services based upon an agreed upon scope of work between Contractor and Owner. The Contractor shall permit the Town a minimum of 10 days in advance to schedule the stakeout work. It is the Contractors Responsibility to;

1. Protect all stakes, marks and control points which the Owner has caused to be set; any which are damaged or destroyed will be replace at the Contractor's expense.
2. Construct his work in accordance with the stakes and marks, transferring them accurately as required.
3. Notify Owner or Engineer IMMEDIATELY upon discovering any apparent discrepancy in the Drawings, or the stakes and marks, or between the two, before performing any work affected by the apparent discrepancy.
4. The contractor shall exercise proper care and caution to verify grades and figures given him before proceeding with the Work, and shall be responsible for any damage or defective work caused by failure of such care and caution.

REPORTS AND STUDIES

The following reports shall be made available to the Bidder(s) upon request;

1. Phase I & Phase II Environmental Assessment as prepared by Quible & Associates, PC dated July 2007.
2. Report of Subsurface Investigation and Geotechnical Engineering Services as prepared by GET Solutions, Inc. dated March 31, 2016

LABOR; WORKING HOURS

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday (7:00 am to 6:00 pm). Contractor will not perform Work on a Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

DIVISION 1 – GENERAL REQUIREMENTS

SECTION 002513 - PREBID MEETINGS

1.1 PREBID MEETING

- A. Architect will conduct a Prebid meeting as indicated below:
 - 1. Meeting Date: June 16, 2016
 - 2. Meeting Time: 11:00 AM
 - 3. Location: Nags Head Board Room, 5401 S. Croatan Hwy., Nags Head, NC

- B. Attendance:
 - 1. Prime Bidders: Attendance at Prebid meeting is recommended.
 - 2. Subcontractors: Attendance at Prebid meeting is recommended.

- C. Bidder Questions: Submit written questions to be addressed at Prebid meeting minimum of **two** business days prior to meeting.

- D. Agenda: Prebid meeting agenda will include review of topics that may affect proper preparation and submittal of bids, including the following:
 - 1. Procurement and Contracting Requirements:
 - a. Advertisement for Bids.
 - b. Instructions to Bidders.
 - c. Bidder Qualifications.
 - d. Bonding.
 - e. Insurance.
 - f. Bid Security.
 - g. Bid Form and Attachments.
 - h. Bid Submittal Requirements.
 - i. Bid Submittal Checklist.
 - j. Notice of Award.

 - 2. Communication during Bidding Period:
 - a. Obtaining documents.
 - b. Access to Project Web site.
 - c. Bidder's Requests for Information.
 - d. Bidder's Substitution Request/Prior Approval Request.
 - e. Addenda.

 - 3. Contracting Requirements:
 - a. Agreement.
 - b. The General Conditions.
 - c. The Supplementary Conditions.
 - d. Other Owner requirements.

 - 4. Construction Documents:
 - a. Scopes of Work.
 - b. Temporary Facilities.

- c. Use of Site.
 - d. Work Restrictions.
 - e. Alternates, Allowances, and Unit Prices.
 - f. Substitutions following award.
5. Separate Contracts:
- a. Work by Owner.
 - b. Work of Other Contracts.
6. Schedule:
- a. Project Schedule.
 - b. Contract Time.
 - c. Liquidated Damages.
 - d. Other Bidder Questions.
7. Site/facility visit or walkthrough.
8. Post-Meeting Addendum.
- E. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes to attendees and others known by the issuing office to have received a complete set of Procurement and Contracting Documents. Minutes of meeting are issued as Available Information and do not constitute a modification to the Contracting Documents. Modifications to the Contracting Documents are issued by written Addendum only.
- 1. Sign-in Sheet: Minutes will include list of meeting attendees.
 - 2. List of Planholders: Minutes will include list of planholders.

END OF DOCUMENT 002513

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 SUMMARY

- A. This Section includes the following:
 - 1. Work covered by the Contract Documents.
- B. Related Sections include the following:
 - 1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: Dowdy Park – Phase One
 - 1. Project Location: 3005 S. Croatan Hwy.
Nags Head, NC 27959
- B. Owner: Town of Nags Head
- C. Owner's Representative: David Ryan, P.E.
Civil Engineer P.O. Box 99
Nags Head, NC 27959
- D. Landscape Architect: CLH Design, P.A.
400 Regency Forest Drive Suite 120
Cary, NC 27518
- E. Architect: Cahoon & Kasten Architects
118 W. Woodhill Dr.
Nags Head, NC 27959
- F. Plumbing & Electrical: Pace Collaborative
1277 Perimeter Parkway
Virginia Beach, VA 23454
- G. The Work consists of the following:
 - 1. The work for the Dowdy Park – Phase One- Base Bid will include:

- a. Construction will consist of a new multi-purpose building, a new parking lot, paved trails, playground elements, associated plumbing and electrical development, new site lighting and related site and infrastructure improvements.
- b. Work by Others: Playground Equipment Purchase, Installation & Surface Improvements, Site Furnishings
 - 1) The main project base bid package will not include the purchase, installation and safety surface improvements.
 - 2) General Contractor is responsible for coordinating with the playground and site furnishing contractor(s).
 - 3) General Contractor shall grade to a subgrade to a depth of 7-inches below finished grade underneath poured in place surfacing and 13-inches below finished grade underneath the engineered wood fiber in the play area locations. See grading plans for finish grade.
 - 4) Playground surfacing, aggregate base and geotextile fabric is by Owner's playground contractor.
 - 5) All work shown in the enlarged details on sheet C1.2 and playground surfacing details on sheet C7.3 besides playground surfacing, equipment, aggregate base and geotextile fabric is in base bid.
 - 6) The main base bid package will not include the purchase and installation of typical site furnishings, (i.e. art bench, backed bench, backless bench, game table, tables, chairs, fitness signage, (2) fitness stations, "Tornado" shade structures, deck shade structure, arbors, colorful poles, art panels, trash receptacles, loggerhead turtle, nest impressions, etc.)
- c. Work by Others: Site Irrigation and Landscaping
 - 1) The main project bidding package will not include irrigation or landscaping. The total project landscape and irrigation sheets have been included for coordination purposes.
 - 2) General Contractor is responsible for coordinating with the future irrigation and landscape contractor.
 - 3) The General Contractor shall include all temporary seeding, necessary grading, final grading, topsoil amendments and adequate topsoil as needed for the landscape contractor to complete the scope of landscaping when awarded.
 - 4) The following sheets have been included for reference only: C5.1, C5.2 and C7.7.
 - 5) Topsoil shall be accepted by the owner before the landscape contractor begins work. General Contractor shall contact the owner for topsoil inspection.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

A. INDEX OF DRAWINGS:

CIVIL

C-0.0	COVER PAGE
C-1.1	SITE STAKING AND PAVEMENT MARKING PLAN
C-1.2	STAKING ENLARGEMENTS
C-2.0	EX. CONDITIONS/EROSION CONTROL/DEMOLITION PLAN
C-3.0	SITE GRADING/DRAINAGE PLAN/CONDUIT PLAN
C-5.1	LANDSCAPE PLAN (NOT IN BASE BID)
C-7.1	SITE DETAILS
C-7.2	SITE DETAILS
C-7.3	SITE DETAILS
C-7.4	SITE DETAILS
C-7.5	SITE DETAILS
C-7.6	SITE DETAILS

ARCHITECTURAL

- A-0.1 CODE SUMMARY
- A-1.1 PAVILION FOUNDATION AND FLOOR PLAN
- A-1.2 PAVILION ROOF AND REFLECTED CEILING PLAN
- A-1.3 PAVILION ROOF FRAMING PLAN
- A-2.1 PAVILION EXTERIOR ELEVATIONS.
- A-3.1 PAVILION BUILDING SECTIONS
- A-4.1 PAVILION CONSTRUCTION DETAILS
- A-4.2 PAVILION COLUMN ELEVATIONS
- A-4.3 PAVILION RAFTER TIE DETAILS

PLUMBING

- P-0.1 PLUMBING GENERAL NOTES, LEGEND & ABBREVIATIONS
- P-1.0 SITE PLAN

ELECTRICAL

- E-0.1 ELECTRICAL GENERAL NOTES, LEGEND & ABBREVIATIONS
- E-0.2 ONE-LINE DIAGRAM & DETAILS
- E-0.3 LIGHTING DETAILS
- E-0.4 LIGHTING DETAILS
- E-1.0 SITE PLAN
- E-1.1 PAVILION PLANS

END OF SECTION 011000

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 1 Section "Quality Requirements" for general testing and inspecting requirements.
 - 3. Division 1 Section "Allowances" for quantity allowances related to unit prices.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Form of Proposal, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- C. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price. Space for the bidder to indicate separate Unit Price for any item(s) of work for which the precise quantity of same cannot be accurately determined in advance, and which the Owner desires to measure and pay for on a unit price basis. A change order shall be initiated, based on the estimated quantities of such work, and a purchase order issued, before any such work is begun. Unit price information shall be utilized to divide portions of the work that will be applied to grant funds received for the project.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES – Reference: Bid Form Article 5.01.D

END OF SECTION 012200

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

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

1.4 PROCEDURES

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

Alternate No. 1, Pavilion

Provide the cost to ADD construction of the single-story wood frame structure as described on Architectural Sheets A1.0 through A 4.3 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation. Should the pavilion be omitted from the project scope, the electrical service and lighting control equipment (Panel MDP, lighting contactor, and timeclock) shall be installed on a stainless steel equipment rack in the vicinity of the pad mounted transformer. Refer to the attached "Equipment Rack Detail" for construction of

the rack, (see below). The main safety switch shall be omitted from the project. All remaining electrical equipment (Panel MDP, lighting contactor, and timeclock) shall be provided with NEMA 4X stainless steel enclosures.

Alternate No. 2 Promenade Trellis

Provide the cost to ADD construction of the treated wood trellis and vertical shade screen members as described on Detail Sheet C7.5 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation.

Alternate No.3. Elevated Wood Walkway

Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Walkway Performance Specification section 061533. See plan sheet C-1.1 for location and detail sheet C-7.6.

Alternate No. 4. Elevated Wood Deck/Stairs

Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Deck Performance Specification section 061533. See plan sheet C-1.1 for location. The shade structure and supporting framing shall be performed by others.

Alternate No. 5. Brick Pavers

Provide the cost to ADD the materials and labor for the installation of brick paver border specified in the Event Plaza. Refer to Specification Section 321313- Concrete Paving and Specification section 321416 Unit Pavers. See plan sheet C-1.1 for location and detail sheet C-7.3 for Picture Frame Finish and Concrete Unit Paver Details.

Alternate No. 6. Concrete Walkways

Provide a DEDUCT cost based upon the following reduced typical concrete walkway widths;

- 15 ft. continuous sidewalk width reduced to 12 ft. in total width,
- 10 ft. continuous sidewalk width reduced to 8 ft. in total width,
- 6 ft. continuous sidewalk width reduced to 5 ft. in total width.

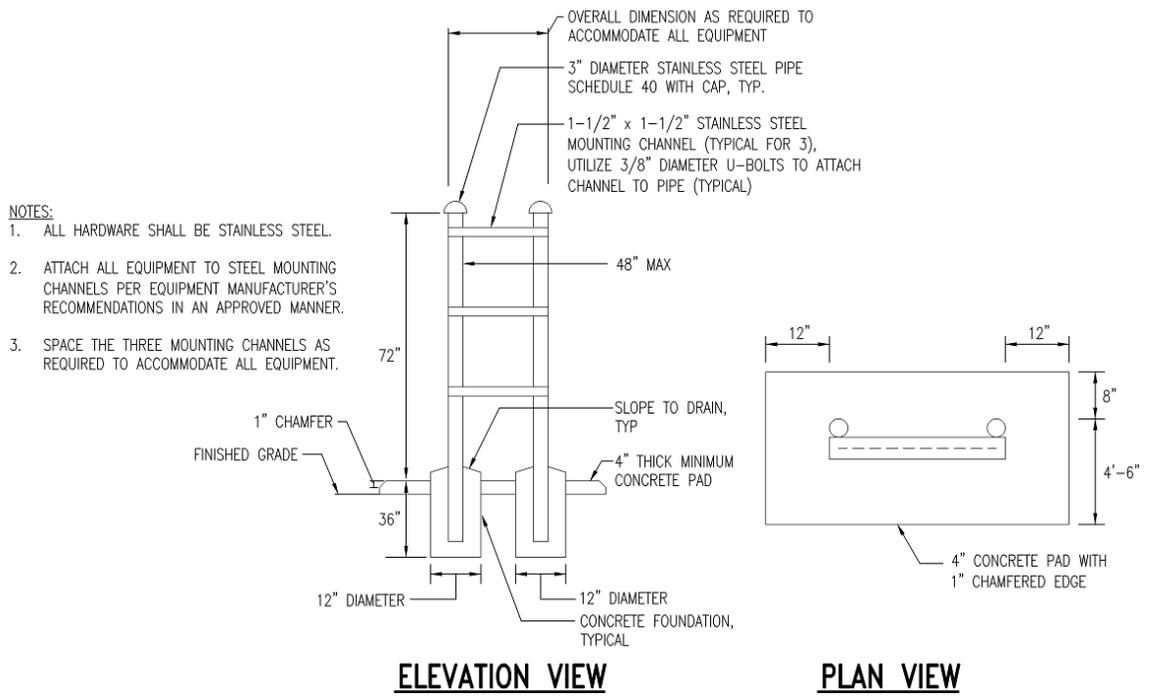
This cost shall include furnishing of materials and labor for the installation of concrete walkways. Refer to Specification Section 321313- Concrete Paving. See plan sheet C-1.1 for location and detail sheet C-7.3 for Concrete Walkway Picture Frame Finish.

Alternate No.7. Parking Lot Lighting

Provide the cost to ADD materials, labor and installation of Parking Lot Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.

Alternate No.8. Bollard Pathway Lighting

Provide the cost to ADD materials, labor and installation of Bollard Pathway Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.



EQUIPMENT RACK DETAIL

NO SCALE

END OF SECTION 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 4. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to the Owner.

1.4 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant

qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of Architect / Engineers and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from 2009 North Carolina State Building Code.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Project Lead's Action: If necessary, Project Lead will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Project Lead will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Project Lead's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect / Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
1. Conditions: Project Lead will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Project Lead will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Project Lead will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect / Engineer.
1. Conditions: Project Lead will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Project Lead will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect / Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution will not affect Contractor's construction schedule.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500



SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase)

Project: _____ Substitution Request Number: _____

 From: _____
 To: _____ Date: _____

 A/E Project Number: _____
 Re: _____ Contract For: _____

Specification Title: _____ Description: _____
 Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____
 Manufacturer: _____ Phone: _____
 Address: _____
 Trade Name: _____ Model No.: _____
 Installer: _____ Phone: _____
 Address: _____

History: New product 1-4 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product: _____

Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
 Address: _____ Owner: _____
 _____ Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Savings to Owner for accepting substitution: _____ (\$ _____).

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days.

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Phase — Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
 - Same warranty will be furnished for proposed substitution as for specified product.
 - Same maintenance service and source of replacement parts, as applicable, is available.
 - Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
 - Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
 - Proposed substitution does not affect dimensions and functional clearances.
 - Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
 - Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
-

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments:

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E
 Other:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Project Lead will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included in the Project Manual.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Project Lead will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Project Lead are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms provided by Owner. Sample copies are included in the Project Manual.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Project Lead.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 7. Proposal Request Form: Use form provided by Owner. Sample copy is included in Project Manual.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: Refer to Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit Price Adjustment: Refer to Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Project Lead will issue a Change Order for signatures of Owner and Contractor on form included in Project Manual.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Project Lead may issue a Construction Change Directive on form included in Project Manual. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Owner's Section "Pay Request and Change Order Submittal Instructions" following this section
 - 2. Division 1 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect / Engineer at earliest possible date but no later than **seven** days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least **TWO** line items for each Specification Section; one for material and one for labor.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect / Engineer.
 - c. Contractor's name and address.
 - d. Date of submittal.
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

- a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value.
- 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate. **Include separate line items under required principal subcontracts for operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training.**
 4. Round amounts to nearest whole penny; total shall equal the Contract Sum.
 5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
 6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 7. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 - b. A portion of the funds incorporated into the Project are directly associated with Grant(s) obtained for specific elements of the Project. The Town will identify the specific items, or portions thereof, which will be required to be shown as separate line item(s) in the Schedule of Values and calculated separately.
 8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with Schedule of Values and previous applications and payments as certified by Project Lead and paid for by Owner.
- B. See following Owner's document "PAY REQUEST AND CHANGE ORDER SUBMITTAL INSTRUCTIONS."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. Coordination Drawings.
 - 2. Administrative and supervisory personnel.
 - 3. Project meetings.
 - 4. Requests for Interpretation (RFIs).
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections include the following:
 - 1. Division 1 Section "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 2. Division 1 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.
- D. Owner Representatives
 - 1. Project Lead: Civil Engineer: Town of Nags Head, David Ryan, P.E.
 - a. Landscape Architect: CLH Design, P.A., Bill Hamilton, PLA
 - b. Plumbing & Electrical Engineer: Pace Collaborative, Jim Bedois, P.E.
 - c. Architect: Cahoon + Kasten Architects, Mark Kasten

1.3 DEFINITIONS

- A. RFI: Request For Information. Request from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
 - 9. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
 - 1. Content: Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of Architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate required installation sequences.
 - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect / Engineer for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
 - 2. Sheet Size: At least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (610 by 915 mm).
 - a. Number of Copies: Submit seven (7) opaque copies of each submittal. Architect / Engineer will return three copies.
 - 3. Refer to individual Sections for Coordination Drawing requirements for Work in those Sections.
- B. Key Personnel Names: Within **15** days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Project Lead of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Project Lead, within **three** days of the meeting.

- B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Project Lead, but no later than **15** days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.
 - 1. Attendees: Authorized representatives of Owner, Project Lead, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Critical work sequencing and long-lead items.
 - c. Designation of key personnel and their duties.
 - d. Procedures for processing field decisions and Change Orders.
 - e. Procedures for RFIs.
 - f. Procedures for testing and inspecting.
 - g. Procedures for processing Applications for Payment.
 - h. Distribution of the Contract Documents.
 - i. Submittal procedures.
 - j. Preparation of Record Documents.
 - k. Use of the premises
 - l. Work restrictions.
 - m. Owner's occupancy requirements.
 - n. Responsibility for temporary facilities and controls.
 - o. Construction waste management and recycling.
 - p. Parking availability.
 - q. Office, work, and storage areas.
 - r. Equipment deliveries and priorities.
 - s. Security.
 - t. Progress cleaning.
 - u. Working hours.
 - 3. Minutes: **Project Lead will record** and distribute meeting minutes.

- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Project Lead of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. The Contract Documents.
 - b. Related RFIs.
 - c. Related Change Orders.
 - d. Purchases.

- e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Testing and inspecting requirements.
 - q. Installation procedures.
 - r. Coordination with other work.
 - s. Required performance results.
 - t. Protection of adjacent work.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at intervals occurring **once a month**. Coordinate dates of meetings with preparation of payment requests.
1. Attendees: In addition to representatives of Owner and Architect / Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Status of submittals.
 - 2) Progress cleaning.
 - 3) Status of correction of deficient items.
 - 4) Field observations.
 - 5) RFIs.
 - 6) Status of proposal requests.
 - 7) Pending changes.
 - 8) Status of Change Orders.
 - 9) Documentation of information for payment requests.
 3. Minutes: Project Lead will record and distribute to Contractor the meeting minutes.
 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INTERPRETATION (RFIs)

- A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI in the form specified.
 1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following:
 1. Project name.
 2. Date.
 3. Name of Contractor.
 4. Name of Architect / Engineer.
 5. RFI number, numbered sequentially.
 6. Specification Section number and title and related paragraphs, as appropriate.
 7. Drawing number and detail references, as appropriate.
 8. Field dimensions and conditions, as appropriate.
 9. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 10. Contractor's signature.
 11. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C. Hard-Copy RFIs:
 1. Identify each page of attachments with the RFI number and sequential page number.
- D. Project Lead's Action: Project Lead will review each RFI, determine action required, and return it. Allow **seven** working days for Project Lead's response for each RFI. RFIs received after 1:00 p.m. will be considered as received the following working day.
 1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect / Engineer's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.
 2. A Project Lead's action may include a request for additional information, in which case Architect / Engineer's time for response will start again.
 3. Project Lead's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect / Engineer in writing within **10** days of receipt of the RFI response.
- E. On receipt of Project Lead's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect / Engineer within **seven** days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at each progress meeting:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect / Engineer.
4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect / Engineer's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Field condition reports.
 - 6. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
 - 4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

- A. Qualification Data: For scheduling consultant.
- B. Submittals Schedule: Submit five (5) copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Project Lead's final release or approval.
- C. Contractor's Construction Schedule: Submit five opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
 - 1. Submit an electronic copy of schedule, using software indicated, on CD-R, and labeled to comply with requirements for submittals. Include type of schedule (Initial or Updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit five copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

1.4 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Project Lead's request.

1.5 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Submit concurrently with preliminary bar-chart schedule. Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Acceptance.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than [20] days, unless specifically allowed by Project Lead.
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Project Lead's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 3. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Acceptance.
- E. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
1. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
 2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Project Lead's approval, be assigned to fabrication and delivery activities. Costs shall be under required principal subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project Record Documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
 3. Each activity cost shall reflect an accurate value subject to approval by Project Lead.
 4. Total cost assigned to activities shall equal the total Contract Sum.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.
- G. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.

- a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Project Lead's approval of the schedule.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- D. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the Schedule of Values).
- E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.

2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- F. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At intervals occurring twice a month, update schedule to reflect actual construction progress and activities. Issue schedule three days before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Project Lead, Contractor Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

1.2 INFORMATIONAL SUBMITTALS

- A. Digital Photographs: Submit unaltered, original, full-size image files within three days of taking photographs.
 - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Date photograph was taken.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.

2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.
- D. Periodic Construction Photographs: Take photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take color photographs after date of Substantial Completion for submission as Project Record Documents.
- F. Additional Photographs: Architect/Engineer may request photographs in addition to periodic photographs specified.

END OF SECTION 013233

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 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
 - 3. Division 1 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
 - 4. Division 1 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
 - 5. Division 1 Section "Closeout Procedures" for submitting warranties.
 - 6. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 7. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Divisions 2 through 33 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Project Lead's responsive action.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will NOT be provided by Project Lead for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Project Lead reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 3. Provide submittals for all exterior building and site components with appropriate manufacturer's color and finishes samples at one time.
 - a. **Architect / Engineer reserves** the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 4. Provide submittals for all interior building components with appropriate manufacturer's color and finishes at one time.
 - a. **Architect / Engineer reserves** the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
 5. Provide submittals for coordination of ceilings with all components including, but not limited to, access panels, fire alarms, and occupancy sensor devices.
 - a. **Architect / Engineer reserves** the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Project Lead's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Project Lead will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Project Lead's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by Project Lead.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Project Lead.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.

- 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- G. Additional Copies: Unless additional copies are required for final submittal, and unless Project Lead observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Project Lead.
 2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- H. Submittal Coversheet: Provide Submittal Cover Form found in Project Manual. Contractor to provide Submittal Cover Form on every copy of each submittal.
- I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Project Lead will return submittals, without review received from sources other than Contractor.
 1. Transmittal Form: Provide locations on form for the following information:
 - a. Project name.
 2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Project Lead on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- J. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked "reviewed."
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals with mark indicating "reviewed" taken by Project Lead.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Submit electronic submittals directly to extranet specifically established for Project.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's installation instructions.
 - c. Standard color charts.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Standard product operation and maintenance manuals.
 - h. Compliance with specified referenced standards.
 - i. Testing by recognized testing agency.
 - j. Application of testing agency labels and seals.
 - k. Notation of coordination requirements.
 4. Submit Product Data before or concurrent with Samples.
 5. Number of Copies: Submit seven copies of Product Data, unless otherwise indicated. Project Lead will return three copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.
 - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm) but no larger than 24 by 36 inches (610 by 915 mm).
 3. Number of Copies: Submit seven opaque copies of each submittal, unless copies are required for operation and maintenance manuals. Project Lead will return three copies.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Project Lead will return submittal with options selected.
- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Type of product. Include unique identifier for each product.
 2. Number and name of room or space.
 3. Location within room or space.
 4. Number of Copies: Submit five copies of product schedule or list, unless otherwise indicated. Project Lead will return two copies.
 - a. Mark up and retain one returned copy as a Project Record Document.
- F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Number of Copies: Submit five copies of subcontractor list, unless otherwise indicated. Project Lead will return two copies.

- a. Mark up and retain one returned copy as a Project Record Document.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Project Lead.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 PROJECT LEAD'S/ ACTION

- A. General: Project Lead will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Project Lead will review each submittal, make marks to indicate corrections or modifications required, and return it. Project Lead will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

SUBMITTAL COVER FORM

PROJECT: Dowdy Park – Phase One
Town of Nags Head

PROJECT NO.:

TO:

FROM:

_____ CONTRACTOR _____ SUBCONTRACTOR

We submit for your consideration the following product for the above project:

SPECIFICATION SECTION	SPECIFICATION PARAGRAPH	DESCRIPTION
_____	_____	_____

TYPE OF SUBMITTAL:

- _____ Specified Brand Product
- _____ Proposed Equivalent Product to Specified Brand
- _____ Product Meeting Performance Specification (No Brand Specified)

We warrant the following:

- a. We have personally investigated the proposed product, and determined that it is equal in all respects to that specified and/or performance specification requirements;
- b. We will provide the specified guarantee for this product;
- c. We will coordinate installation of this product into the work, making such changes as maybe required for the work to be complete in all respects;
- d. We have clearly indicated by marking as "Non-Complying Feature" each and every requirement of the Specifications that this product does not meet;
- e. And, we waive all claims for additional costs related to this product which subsequently become apparent.

Attached hereto are complete technical data, including applicable laboratory reports, to demonstrate compliance with project requirements.

SUBMITTED BY:

SIGNATURE

DATE

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 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Project Lead, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections include the following:
 - 1. Division 1 Section "Allowances" for testing and inspecting allowances.
 - 2. Division 1 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 3. Divisions 2 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Project Lead.
- C. Mockups: Full-size, physical assemblies that are constructed on-site. Mockups are used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Approved mockups establish the standard by which the Work will be judged.
- D. Laboratory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.

- E. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- F. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- G. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- H. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- I. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- J. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- K. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Project Lead for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Project Lead for a decision before proceeding.

1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.

4. Identification of test and inspection methods.
5. Number of tests and inspections required.
6. Time schedule or time span for tests and inspections.
7. Entity responsible for performing tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

C. Reports: Prepare and submit certified written reports that include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

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

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by Project Lead.
 2. Notify Project Lead seven days in advance of dates and times when mockups will be constructed.
 3. Demonstrate the proposed range of aesthetic effects and workmanship.
 4. Obtain Project Lead's approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 6. Demolish and remove mockups when directed, unless otherwise indicated.

1.7 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Project Lead and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Project Lead and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for the Notice to Proceed.
 - 1. Distribution: Distribute schedule to Owner, Project Lead, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.8 SPECIAL TESTS AND INSPECTIONS

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Project Lead.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Project Lead and Architect / Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - ~~2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."~~
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

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 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner Project Lead, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Water Service: Water from Owner's existing water system is available for use provided a temporary meter is installed. General Contractor to provide meter, as applicable, connections and extensions of services as required for construction operations.
- C. Electric Power Service: Electric power from Owner's existing system is available for use provided a temporary meter is installed. General Contractor to provide meter, connections and extensions of services as required for construction operations.

1.4 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 QUALITY ASSURANCE

- A. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.76-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top rails
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- C. Paint: Comply with requirements in Division 9 painting Sections.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 4 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table and chairs.
 - 3. Drinking water and private toilet.
 - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
 - 5. Lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.

2.3 EQUIPMENT

- A. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service with a meter.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Meter must be installed, as applicable, for Owner's existing water service facilities to be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- F. Electric Power Service: Use of Owner's existing electric power service will be permitted, if it exists, as long as equipment is maintained in a condition acceptable to Owner.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
 - 1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
 - b. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
 - 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
 - 3. A secured, six (6) foot high chain-link fence is required for contractor's staging/lay-down area.
- B. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs where indicated to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
 - 1. Provide temporary, directional signs for construction personnel and visitors.
 - 2. Maintain and touchup signs so they are legible at all times.
- C. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Construction Waste Management."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 1 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 2
- C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion.

Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related Sections include the following:
 - 1. Division 1 Section "Alternates" for products selected under an alternate.
 - 2. Division 1 Section "References" for applicable industry standards for products specified.
 - 3. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 4. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

- A. Substitution Requests: Project Lead will only consider requests for substitution of materials, product or equipment proposed by the bidders to those specified herein will only be considered during the bidding phase until seven (7) days prior to the receipt of bids when submitted with sufficient data. Proposed substitutions submitted after this time will be considered only as potential change order.

Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use CSI Form 13.1A.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Project Leads and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 3. Project Lead's Action: If necessary, Project Lead will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Project Lead will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Project Lead cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Project Lead's Action: If necessary, Project Lead will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Project Lead will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Project Lead cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Store cementitious products and materials on elevated platforms.
 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.

- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Project Lead or Architect / Engineer will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Project Lead's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

- B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 - 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 - 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.

5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

- A. Timing: Project Lead will not consider requests for substitution if received after the bid date. Requests received after that time may or may not be considered or rejected at discretion of Project Lead.
- B. Conditions: Project Lead will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Project Lead will return requests without action, except to record noncompliance with these requirements:
 1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Project Lead for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution does not require extensive revisions to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Project Lead will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Project Lead will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Project Leads and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

- 1. Construction layout.
- 2. General installation of products.
- 3. Coordination of Owner-installed products.
- 4. Progress cleaning.
- 5. Starting and adjusting.
- 6. Protection of installed construction.
- 7. Correction of the Work.

- B. Related Sections include the following:

- 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
- 2. Division 1 Section "Submittal Procedures" for submitting surveys.
- 3. Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Project Lead. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Project Lead promptly.
- B. General:
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Project Lead when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Project Lead.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Project Lead.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction forces at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. ~~Comply with requirements in Division 1 Section "Cutting and Patching."~~

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT & DISPOSAL OF NONHAZARDOUS MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural guidance for the following:

- 1. Salvaging nonhazardous demolition and construction waste.
- 2. Recycling nonhazardous demolition and construction waste.
- 3. Disposing of nonhazardous demolition and construction waste.

- B. Related Sections: NONE

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS

- A. General: The Owner wants this Project to generate the least amount of waste possible. Achieve end-of-Project rates for salvage/recycling of 50 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

- 1. Demolition Waste:

- a. Brick.
- b. Wood trim.
- c. Rough hardware.
- d. Doors and frames.
- e. Door hardware.
- f. Glazing.
- g. Metal studs.
- h. Gypsum board.
- i. Acoustical tile and panels.
- j. Demountable metal partitions.
- k. Cabinets.
- l. Plumbing fixtures.
- m. Piping.
- n. Supports and hangers.
- o. Valves.
- p. Mechanical equipment.
- q. Refrigerants.
- r. Electrical conduit.
- s. Copper wiring.
- t. Lighting fixtures.
- u. Lamps.
- v. Ballasts.
- w. Electrical devices.
- x. Porcelain ceramic tile.

2. Construction Waste:

- a. Site-clearing waste.
- b. Wood trim.
- c. Metals.
- d. Gypsum board.
- e. Piping.
- f. Electrical conduit.
- g. Packaging: Regardless of salvage/recycle goal indicated in paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates.
 - 7) Plastic pails.

1.5 ACTION SUBMITTALS - DELETED

1.6 INFORMATIONAL SUBMITTALS -DELETED

1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of Projects with similar requirements.

- B. ~~Refrigerant Recovery Technician Qualifications: Certified by EPA approved certification program.~~
- C. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: DELETED

1.8 WASTE MANAGEMENT PLAN -DELETED

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Waste Management Coordinator: The contractor shall employ a waste management coordinator shall be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 - 1. Distribute waste management plan to all parties engaged in the work including the Owner's representative within three days of waste management plan submittal return.
 - 2. Review plan procedures and locations established for salvage, recycling, and disposal to entities when they first begin work on-site or at pre-installation conference whichever comes first.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: These items must be removed and stored off-site within 7 days of removal from original location. No signage indicating their sale will be permitted on site.
 - C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
 - D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
 - E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
 - F. Plumbing Fixtures: Separate by type and size.
 - G. Lighting Fixtures: Separate lamps by type and protect from breakage.
 - H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panel boards, circuit breakers, and other devices by type.
- 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL
- A. General: Recycle paper and beverage containers used by on-site workers.
 - B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:
 - C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
 - D. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
 - E. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 3. Stockpile materials away from construction area. Do not store within drip line of trees.

4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor as soon as possible after removal from original location.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcing material. Break up and transport to concrete recycling facility.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals. Transport masonry to masonry recycling facility.
 1. Existing brick to be salvaged for reuse.
 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length.
- E. Metals: Separate metals by type.
 1. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- H. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- I. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- J. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees at landfill facility.
 1. Comply with requirements in Division 32 Section "Plants" for use of chipped organic waste as organic mulch.
- C. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in Division 32 Section "Plants." for use of clean sawdust as organic mulch.
- D. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.
 - a. Comply with requirements in Division 32 Section "Plants." for use of clean ground gypsum board as inorganic soil amendment.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

3.7 ATTACHMENTS (FOLLOWING THIS SECTION)- DELETED

END OF SECTION 017419

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 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

- B. Related Sections include the following:

1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
5. Division 1 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
6. Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

8. Complete startup testing of systems.
9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Complete final cleaning requirements, including touchup painting.
14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Project Lead will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Lead will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Project Lead, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
2. Submit certified copy of Project Lead's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Project Lead. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Project Lead will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Lead will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first; proceeding from lowest area to highest areas.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.

- b. Date.
- c. Name of Project Lead.
- d. Name of Contractor.
- e. Page number.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Project Lead for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

- 1. Operation and maintenance documentation directory.
- 2. Emergency manuals.
- 3. Operation manuals for systems, subsystems, and equipment.
- 4. Product maintenance manuals.
- 5. Systems and equipment maintenance manuals.

- B. Related Sections:

- 1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
- 2. Division 01 Section "Closeout Procedures" for submitting copies of submittals for operation and maintenance manuals.
- 3. Division 01 Section "Project Record Documents" for submitting copies of submittals for operation and maintenance manuals.
- 4. Divisions 02 through 49 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least **15** days before commencing demonstration and training. Project Lead will return copy with comments.
 - 1. Correct or modify each manual to comply with Project Lead's comments. Submit copies of each corrected manual within **15** days of receipt of Project Lead's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Construction Manager.
 - 7. Name and contact information for Project Lead.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, **loose-leaf** binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor is delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.

4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Division 01 Section "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
 - 2. Division 01 Section "Execution" for final property survey.
 - 3. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal: Submit **one paper copy set** of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.
 - b. Final Submittal: Submit **one paper copy set** of marked-up record prints, **one** set of record digital data files.
- B. Record Specifications: Submit **one paper copy** of Project's Specifications, including addenda and contract modifications.
- C. Record Show Drawings and Product Data:
 - 1. Project Lead will forward one set of shop drawings and product data to the Owner through the term of construction and these documents will constitute the Owner's record documents.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order.
 - k. Changes made following Project Lead's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Project Lead and Architect / Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 2. Consult Project Lead for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.

- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file [**with comment function enabled**].
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Project Lead.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 5. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Specifications as **paper copy**.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes.
- B. Format: Submit record Product Data as **paper copy**.
1. Include record Product Data directory organized by specification section number and title, electronically linked to each item of record Product Data.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1. Include miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Project Lead's reference during normal working hours.

END OF SECTION 017839

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training video recordings.
- B. Related Sections:
 - 1. Divisions 01 Section "Project Management and Coordination" for requirements for preinstruction conferences.
 - 2. Divisions 02 through 49 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit 2 copies of outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules utilizing manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator, instructor, videographer.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit one copy within **seven** days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:

- a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Project Lead.
 - d. Name of Contractor.
 - e. Date of video recording.
2. Transcript: Prepared on 8-1/2-by-11-inch (215-by-280-mm) paper, punched and bound in heavy-duty, three-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
 3. At completion of training, submit complete training manual(s) for Owner's use.

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Project Lead.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 - 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.

- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Project Lead will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.

2. Owner will furnish an instructor to describe Owner's operational philosophy.
 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
1. Schedule training with Owner, with at least **fourteen** days' advance notice.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a **demonstration** performance-based test.
- E. Cleanup: Collect used and leftover educational materials and **give to Owner**. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Provide demonstration videos or DVD's to the owner that are created or and approved by equipment and controls manufacturers for the express purpose of training.
1. For use
 2. For maintenance

END OF SECTION 017900

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Sections:
 - 1. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Material certificates.
- C. Material test reports.
- D. Floor surface flatness and levelness measurements.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- E. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- F. Preinstallation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Steel- and glass-fiber-reinforced plastic, or other approved nonabsorptive panel materials that provide continuous, true, and smooth architectural concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
 - 1. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.
 - 2. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M, epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I gray. Supplement with the following:
 - a. Fly Ash: ASTM C 618, Class F or C.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
 1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330, 3/4-inch (19-mm) nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M and potable.

2.4 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 FIBER REINFORCEMENT

- A. Synthetic Micro-Fiber: Monofilament or fibrillated polypropylene micro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches (13 to 38 mm) long.

2.6 VAPOR RETARDERS

- A. Sheet Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils (0.25 mm) thick.

2.7 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
- G. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
 - 1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- H. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
 - 1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

2.9 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
- B. Cementitious Materials: Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

D. Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 5000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 4 inches for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch (25 mm).
4. Air Content: 4 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch (38-mm) nominal maximum aggregate size.
5. Air Content: 4 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
6. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
7. Synthetic Micro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

2.10 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.11 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 CONCEALED CONCRETE FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

3.2 EXPOSED CONCRETE FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

- C. Do not chamfer exterior corners and edges of permanently exposed concrete.
- D. Limit deflection of form-facing panels to not exceed ACI 303.1 requirements.
- E. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. **Class A, 1/8 inch (3 mm).**
- F. Construct forms to result in cast-in-place architectural concrete that complies with ACI 117 (ASI 117M).
- G. **Do not chamfer** exterior corners and edges of cast-in-place architectural concrete.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete

when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Cold-Weather Placement: Comply with ACI 306.1.
- D. Hot-Weather Placement: Comply with ACI 301.

3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view.
 - 2. Finish and measure surface so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch (6 mm).
- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

3.9 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.10 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

3.11 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

END OF SECTION 033000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Architecturally Exposed Structural Steel
 - 3. Grout.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel and AESS components.

1.5 QUALITY ASSURANCE

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC 303.
 - 2. AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Plate and Bar: ASTM A 36/A 36M.
- B. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
- C. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

- A. In addition to special care used to handle and fabricate AESS, comply with the following:
 1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
 2. Grind sheared, punched, and flame-cut edges of AESS to provide smooth surfaces and edges.
 3. Fabricate AESS with exposed surfaces free of mill marks.
 4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
 5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
 6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
 7. Fabricate AESS to the tolerances specified in AISC 303.
- B. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

- C. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.5 SHOP CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
 - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
 - 2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
 - 3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
 - 4. Provide continuous welds of uniform size and profile where AESS is welded.
 - 5. Make fillet welds of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

2.6 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment.
 - 1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

3.3 ERECTION

- A. Set steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- C. Baseplates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
- D. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened.
 - 2. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Verify structural-steel materials and inspect steel frame joint details.
 - 2. Verify weld materials and inspect welds.
 - 3. Verify connection materials and inspect high-strength bolted connections.
- B. Bolted Connections: Inspect bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.

END OF SECTION 051200

DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking and nailers.
3. Wood furring.
4. Wood sleepers.
5. Utility shelving.
6. Plywood backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Power-driven fasteners.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, [mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - 5. Wood floor plates that are installed over concrete slabs-on-grade.
 - 6. Plywood backing panels.

2.3 DIMENSION LUMBER FRAMING

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.
- B. Other Framing: No. 2 grade of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Southern pine; SPIB.
 - 3. Douglas fir-larch; WCLIB or WWPA.
 - 4. Southern pine or mixed southern pine; SPIB.
 - 5. Spruce-pine-fir; NLGA.
 - 6. Douglas fir-south; WWPA.
 - 7. Hem-fir; WCLIB or WWPA.
 - 8. Douglas fir-larch (north); NLGA.
 - 9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.

C. Utility Shelving: Lumber with 15 percent maximum moisture content of eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. Concealed Boards: 15 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 Common grade; NELMA.
3. Northern species, No. 2 Common grade; NLGA.
4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Screws for Fastening to Metal Framing: ASTM C 954, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 06 15 33 - WOOD PATIO DECKING / WAVY WALKWAY – PERFORMANCE SPECIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Wood decking.
2. Stairs for elevated decks.
3. Support framing for elevated decks.
4. Elevated Wavy Wood Walkway

- B. Related Requirements:

1. ~~Section 072500 "Weather Barriers" for flexible flashing used with patio decking.~~
2. ~~Section 076200 "Sheet Metal Flashing and Trim" for sheet metal flashing used with patio decking.~~

- C. The work to be done shall include furnishing all plans, all labor, materials, equipment and services for the Wavy Walk and Observation Deck. See drawings for location and approximate sizes. Work performed shall be as indicated on the drawings, as specified herein; or both.

- D. The Drawings and Specifications must be interpreted and are intended to complement each other. The Contractor shall furnish and install all parts, which may be required by the Drawings and omitted by the specifications, or vice versa. Should there appear to be discrepancies or question of intent, the Contractor shall refer the matter to the Owner's Representative for decision, and his interpretation shall be final, conclusive and binding.

1.3 DEFINITIONS

- A. Boards: Lumber of less than 2 inches nominal (38 mm actual) in thickness and 2 inches nominal (38 mm actual) or greater in width.

- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

- C. Timber: Lumber of 5 inches nominal (114 mm actual) or greater in least dimension.

- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPAA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

- A. Product Data: For preservative-treated wood products.
 - 1. For preservative-treated wood products. Include chemical treatment manufacturer's written instructions for handling, storing, installing, and finishing treated material.
- B. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
 - 1. Wavy Walk and Observation Deck construction plans and details, to scale, indicating location, size, and type of all posts, joists, deck boards, fasteners, etc.
 - 2. Itemized list of materials.
 - 3. Qualification data for firm, contractor or sub-contractor performing the design and construction.
 - a. Include a list of three recently completed decking or wooden walkway projects within the past five years.
 - b. Include contact information for three references.
 - 4. Construction duration schedule.
- C. Record Drawings
 - 1. The contractor shall provide and keep up-to-date a complete redlined record set of drawings of the walk and deck as the project proceeds. Drawings shall be corrected daily, showing every change from the original Drawings and Specifications
 - 2. Contractor to deliver record drawings to Owner's Representative as part of contract closeout. Deliver of drawings will not relieve Contractor of the responsibility of furnishing information that may have been omitted from the prints or outstanding punchlist inspection items.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates:
 - 1. For lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by ALSC's Board of Review.
 - 2. For preservative-treated wood products. Indicate type of preservative used and net amount of preservative retained. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Certificates of Inspection: Issued by lumber grading agency for exposed wood products not marked with grade stamp.
- C. Evaluation Reports: For the following, from ICC-ES:
 - 1. Preservative-treated wood products.
 - 2. Expansion anchors.
 - 3. Metal framing anchors.
 - 4. Decking fasteners.

1.6 QUALITY ASSURANCE

- A. Lumber Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

- B. Lumber Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 LUMBER, GENERAL

- A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.
 - 1. Factory mark each item with grade stamp of grading agency.
 - 2. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
 - 4. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Regional Materials: Wood products shall be milled within 500 miles (800 km) of Project site from wood that has been harvested within 500 miles (800 km) of Project site.
- C. Certified Wood: Boards and dimension lumber shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and to FSC STD-40-004, "FSC Standard for Chain of Custody Certification."
- D. Maximum Moisture Content:
 - 1. Boards: 15 percent.
 - 2. Dimension Lumber: 15 percent
 - 3. Timber. 19 percent.

2.2 WOOD DECKING AND STAIR TREADS

- A. Hand select wood for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.
- B. Dimension Lumber Decking and Stair Treads: No. 2 grade southern pine.
- C. Board Decking and Stair Treads: 1-1/4-inch (32-mm) actual thickness radius-edged decking of No. 2 grade southern pine.

2.3 DIMENSION LUMBER FRAMING

- A. Deck and Stair Framing: No. 2 southern pine: SPIB.

2.4 POSTS

- A. Dimension Lumber Posts: No. 2 grade southern pine.
- B. Timber Posts: No. 2 grade southern pine.

2.5 PRESERVATIVE TREATMENT

- A. Pressure treat boards and dimension lumber with waterborne preservative according to AWP A U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
- B. Pressure treat timber with waterborne preservative according to AWP A U1; Use Category UC4a.
- C. Pressure treat poles with waterborne preservative according to AWP A U1; Use Category UC4a.
- D. Preservative Chemicals: Acceptable to authorities having jurisdiction.
 - 1. Do not use chemicals containing arsenic or chromium.
- E. After treatment, redry boards, dimension lumber and timber to 19 percent maximum moisture content.
- F. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.
 - 1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed or omit marking and provide certificates of treatment compliance issued by inspection agency.
- G. Application: Treat all wood unless otherwise indicated.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide screws, in sufficient length, to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 - 1. Use stainless steel unless otherwise indicated.
 - 2. For pressure-preservative-treated wood, use stainless-steel fasteners.
- B. Nails: ASTM F 1667.
- C. Power-Driven Fasteners: ICC-ES AC70.
- D. Wood Screws and Lag Screws: ASME B18.2.1, ASME B18.6.1, or ICC-ES AC233.
- E. Carbon-Steel Bolts: ASTM A 307 (ASTM F 568M) with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers all hot-dip zinc coated.

- F. Stainless-Steel Bolts: ASTM F 593, Alloy Group 1 or 2 (ASTM F 738M, Grade A1 or Grade A4); with ASTM F 594, Alloy Group 1 or 2 (ASTM F 836M, Grade A1 or Grade A4) hex nuts and, where indicated, flat washers.
- G. Postinstalled Anchors: Stainless-steel, torque-controlled expansion anchors with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing according to ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Stainless-steel bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or Grade A4).

2.7 METAL FRAMING ANCHORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cleveland Steel Specialty Co.
 - 2. KC Metals Products, Inc.
 - 3. Phoenix Metal Products, Inc.
 - 4. R. H. Tamlyn & Sons LP.
 - 5. Simpson Strong-Tie Co., Inc.
 - 6. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, [G60 (Z180)] [G90 (Z270)] [G185 (Z550)] coating designation.
- D. Stainless-Steel Sheet: ASTM A 666, Type 304, Type 316.
- E. Joist Hangers: U-shaped, with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
 - 1. Thickness: 0.062 inch (1.6 mm).
- F. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
 - 1. Strap Width: 2 inches (50 mm).
 - 2. Thickness: 0.062 inch (1.6 mm).
- G. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.
- H. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
 - 1. Width: 1-1/4 inches (32 mm).
 - 2. Thickness: 0.062 inch (1.6 mm).
 - 3. Length: 24 inches (600 mm).

2.8 CONCEALED DECKING FASTENERS

- A. Deck Splines: Corrosion-resistant metal or plastic splines that fit in grooves routed into the sides of decking material and are fastened to deck framing with screws. Splines provide uniform spacing of decking material.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Blue Heron Enterprises, LLC; Eb-Ty Hidden Deck-Fastener.
 - b. Grabber Construction Products; Deck Clip.
 - c. Ipe Clip Fastener Company Inc. (The); Ipe Clip.
 - d. KK Mfg. Co., Inc; Lumber Loc Hidden Deck Fasteners.
 - e. M. M. Products, Inc; Invisi-Fast Biscuit.
 - f. Titan Metal Werks, Inc; DeckEase Hidden Deck Fasteners.
- B. Deck Clips: Black-oxide-coated, stainless-steel clips designed to be fastened to deck framing with screws, and to secure decking material with teeth that also provide uniform spacing of decking material.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Tiger Claw Inc; Tiger Claw Hidden Deck Fasteners.
- C. Deck Tracks: Formed metal strips designed to be fastened to deck framing and to secure decking material from underside with screws. Made from epoxy-powder-coated, hot-dip galvanized steel or stainless steel.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Grabber Deckmaster; Deckmaster.
 - b. Ty-Lan Enterprises Inc; Shadoe Track.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Stain wood indicated to be stained, including both faces and edges. Cut to required lengths and stain ends. Comply with requirements in Section 099300 "Staining and Transparent Finishing."

3.3 INSTALLATION, GENERAL

- A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.
- B. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.
- C. Install wood decking and stair treads with crown up (bark side down).
- D. Install plastic lumber to comply with manufacturer's written instructions.
- E. Secure decking to framing with deck splines, deck clips, deck tracks or screws.
- F. Install metal framing anchors to comply with manufacturer's written instructions.
- G. Do not splice structural members between supports unless otherwise indicated.
- H. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- I. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Securely attach exterior rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. ICC-ES AC70 for power-driven fasteners.
 - 2. "Fastening Schedule" in ICC's International Building Code.
 - 3. "Fastener Schedule for Structural Members" and "Alternate Attachments" in ICC's International Residential Code for One- and Two-Family Dwellings.
- K. Use common wire nails unless otherwise indicated. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.
- L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced and with adjacent rows staggered.

3.4 ELEVATED DECK JOIST FRAMING INSTALLATION

- A. General: Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists where framed into wood supporting members by using wood ledgers as indicated or, if not indicated, by using metal joist hangers. Do not notch joists.
- B. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).
- C. Lap members framing from opposite sides of beams or girders not less than 4 inches (102 mm,) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

- D. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at intervals of 96 inches (2438 mm) o.c., between joists.

3.5 STAIR INSTALLATION

- A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:
 - 1. Stringer Size: 2 by 12 inches nominal (38 by 286 mm actual), minimum.
 - 2. Notching: Notch stringers to receive treads, risers, and supports; leave at least 3-1/2 inches (89 mm) of effective depth.
 - 3. Stringer Spacing: At least three stringers for each 36-inch (914-mm) clear width of stair.
- B. Provide stair framing with no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.
- C. Treads and Risers: Secure by gluing and screwing to carriages. Countersink fastener heads, fill flush, and sand filler. Extend treads over carriages and finish with bullnose edge.

END OF SECTION 06 15 33

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wall sheathing.
 - 2. Roof sheathing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preserved-treated plywood.

PART 2 - PRODUCTS

2.1 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.2 WALL SHEATHING

- A. Plywood Sheathing: Exposure 1, Structural I sheathing.

2.3 ROOF SHEATHING

- A. Plywood Sheathing: Exposure 1, Structural I sheathing.

2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Wall and Roof Sheathing:
 - a. Nail to wood framing 3" on center at edges and 6" in field.
 - b. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION 061600

SECTION 061800 - GLUED-LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes framing using structural glued-laminated timber.

1.2 ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111.
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER

- A. General: Provide structural glued-laminated timber that complies with AITC A190.1 and AITC 117 or research/evaluation reports acceptable to authorities having jurisdiction.
 - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA-EWS trademark. Place mark on surfaces that are not exposed in the completed Work.
 - 2. Provide structural glued-laminated timber made with wet-use adhesive complying with AITC A190.1.
- B. Species and Grades for Structural Glued-Laminated Timber: Southern pine that complies with beam stress classifications indicated.
- C. Species and Grades for Beams and Purlins:
 - 1. Species and Beam Stress Classification: Southern pine, 24F-1.8E.
 - 2. Lay-up: Either balanced or unbalanced.

- D. Appearance Grade: Architectural, complying with AITC 110.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWWA U1; Use Category UC3b.
 - 1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent respectively.
 - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 3. Application: Where indicated.

2.3 TIMBER CONNECTORS

- A. Materials: Unless otherwise indicated, fabricate from the following materials:
 - 1. Structural-steel shapes, plates, and flat bars complying with ASTM A 36/A 36M.
 - 2. Round steel bars complying with ASTM A 575, Grade M 1020.
 - 3. Hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
- B. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.

2.4 MISCELLANEOUS MATERIALS

- A. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- B. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.

2.5 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. End-Cut Sealing: Immediately after end cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood coated for not less than 10 minutes.
- D. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb and with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Handle and temporarily support glued-laminated timber to prevent surface damage, compression, and other effects that might interfere with indicated finish.
- B. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- C. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing.
 - 1. Predrill for fasteners using timber connectors as templates.
 - 2. Finish exposed surfaces to remove planing or surfacing marks.
 - 3. Coat cross cuts with end sealer.

3.2 ADJUSTING

- A. Repair damaged surfaces after completing erection. Replace damaged structural glued-laminated timber if repairs are not approved by Architect.

3.3 PROTECTION

- A. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose, including protection from weather, sunlight, soiling, and damage from work of other trades.
 - 1. Slit underside of wrapping to prevent accumulation of moisture inside the wrapping.

END OF SECTION 061800

SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior **wood** trim.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

B. Samples: For each type of product involving selection of colors, profiles, or textures.

1.3 INFORMATIONAL SUBMITTALS

A. Compliance Certificates:

1. For lumber that is not marked with grade stamp.
2. For preservative-treated wood that is not marked with treatment-quality mark.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20.

1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - a. For exposed lumber, mark grade stamp on end or back of each piece, **or omit grade stamp and provide certificates of grade compliance issued by inspection agency.**

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC3b.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 18 percent respectively.
2. Preservative Chemicals: Acceptable to authorities having jurisdiction **and containing no arsenic or chromium.**
3. Application: **Where indicated.**

2.3 EXTERIOR TRIM

A. Lumber Trim:

1. Species and Grade: Southern pine, pressure-preservative treated; **C & Btr**]; SPIB.
2. Face Surface: **Surfaced (smooth).**

2.4 MISCELLANEOUS MATERIALS

- ### A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
1. For applications not otherwise indicated, provide **hot-dip galvanized-steel** fasteners.
- ### B. Sealants: Latex, complying with ASTM C 834 **Type OP, Grade NF** and with applicable requirements in Section 079200 "Joint Sealants," recommended by sealant manufacturer and manufacturer of substrates for intended application.

PART 3 - EXECUTION

3.1 PREPARATION

- ### A. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed. Cut to required lengths and prime ends. Comply with requirements in Section 099113 "Exterior Painting."

3.2 INSTALLATION, GENERAL

- ### A. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
1. Scribe and cut exterior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.

3.3 STANDING AND RUNNING TRIM INSTALLATION

- ### A. Install flat-grain lumber with bark side exposed to weather.
- ### B. Install trim with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long except where necessary.

1. Use scarf joints for end-to-end joints.
 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water. Cope at returns and miter at corners.

END OF SECTION 062013

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION 074113 - STANDING-SEAM METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes standing-seam metal roof panels.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.
- B. Warranties: Sample of special warranties.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance data.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

- A. General:
 - 1. All guarantees shall be issued to the Owner or party designated by the Designer and shall not require the signature of the Owner.

2. All guarantees shall be issued bearing the signature of an officer of the manufacturer or contractor as applicable.
 3. All guarantees shall commence on the date of final acceptance by the Owner and shall be in force for the durations as noted below.
 4. All guarantees shall cover damage due to wind up to and including the design wind speed as defined by the North Carolina State Building Code.
 5. All guarantees shall not include any language stipulating resolution of disputes through arbitration.
 6. All guarantees shall not include any language excluding coverage for any of the following:
 - a. Failure of the roofing contractor to properly install the roof system or to use properly certified personnel.
 - b. Failure of the roofing contractor to utilize manufacturer approved materials or methods.
 - c. Requirements for the owner to maintain records of material procurement including but not limited to purchase orders, order numbers, manufacturer's invoices or shipment dates.
 - d. Failure of the roofing contractor to correct any deficiencies identified by the manufacturer.
 7. In the event of a claim against the warranty, the manufacturer shall be responsible for all costs related to the investigation of said claim.
- B. Contractor's Warranty: The Contractor and the Owner's representative shall conduct an inspection approximately 30 days prior to the end of the Contractor's guarantee to determine the present physical condition of the roofing system. The Owner's representative shall then submit a written report as to the findings of this inspection and the roofing Contractor, at his own expense, shall repair any defects covered under the scope of this contract.
1. Warranty Period: Two years from date of Substantial Completion.
 2. Form: See form at end of this section.
- C. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.
- D. Special Manufacturer's Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Finish Warranty Period: 30 years from date of Substantial Completion.
- E. Special Manufacturer's Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

- F. Sealant - Manufacturer shall agree that the sealant covered under this contract shall remain free from any physical defects caused by defective workmanship or materials for a period of ten (10) years from the date of final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Loads: As indicated on Drawings.
 - 2. Other Design Loads: As indicated on Drawings.
 - 3. Deflection Limits: For wind loads, no greater than 1/240 of the span.
- B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa)
- C. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.
- D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
 - 1. Uplift Rating: UL 90.
- E. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
 - 1. Fire/Windstorm Classification: Class 1A-90.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
 - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Nominal Thickness: 24 gauge.
 - b. Exterior Finish: Acrylic Coated Galvalume.
 2. Clips: Manufacturer's recommendation.
 3. Panel Coverage: 16 inches (406 mm).
 4. Panel Height: 1.75 inches (44 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.

2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
 - 1. Apply over the entire roof surface.
- B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

3.3 METAL PANEL INSTALLATION

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
 - 4. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 5. Watertight Installation:
 - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - c. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.4 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On

completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

3.5 EMERGENCY REPAIRS:

- A. Emergency repairs to defects and leaks shall be performed within 24 hours of receiving notice from the Owner. As soon as weather permits, permanent repairs and restoration of affected areas shall be accomplished in a manner in conformance with the original contract requirements. This work shall be done without additional cost to the Owner, except if it is determined that such leaks and defects were caused by abuse, lightning, hurricane, tornado, hail storm, or other unusual phenomena.
- B. The warranties shall also state that the Owner has the right, at any time during the 2 year Contractor's warranty period and the Manufacturer's warranty period, to make emergency repairs to protect the contents of the building or the building it-self from damage due to leaking. The cost of emergency repairs made during the first two years of the warranty period shall be borne by the Contractor and action by the Owner shall not invalidate the warranty.
- C. The effective date of all warranties shall be the same and shall be on the date of the last final inspection when the Owner, Designer, Contractor and Manufacturer agree that all work has been completed in substantial compliance with the plans and specifications. This date shall be the date of final acceptance by the Owner.
- D. Final payment will be made to the Contractor only after three (3) copies of the warranties and guarantees have been submitted and the membrane manufacturer acknowledges that all bills are paid. All such documents shall show the project name and location and the Owner's name.

END OF SECTION 074113.16

CONTRACTOR'S GUARANTEE

Whereas,

of

herein called "Contractor", has completed application of the following roof:

Owner:

Address of Owner:

Type & Name of Building:

Building Location:

Area of Roof:

Date of Completion:

Date Guarantee Expires:

Whereas, at the inception of the work, the Contractor agreed to guarantee the aforesaid roof system against faulty workmanship for a limited period and to guarantee that the materials are those required by the agreement, subject to the conditions herein set forth:

Now, therefore, the Contractor hereby guarantees, subject to the conditions herein set forth, that during a period of two years from the date of Owner acceptance of said roof system, it will, at its own cost and expense, make or cause to be made such repairs to said roof resulting solely from faults or defects in workmanship applied by or through the Contractor as may be necessary to maintain said roof system in a watertight condition, and in the event of failure of any material, the Contractor will give reasonable assistance to the Owner in obtaining from the respective manufacturer whatever adjustment is reasonable in light of the manufacturers guarantee.

This guarantee is made subject to the following conditions:

- 1) Specifically excluded from this guarantee are any and all damages caused by lightning, wind in excess of the design wind speed as defined by the International Building Code, hailstorm, or other unusual phenomena of the elements; foundation settlement; failure or cracking of the roof deck; defects or failure of material used as roof base over which roof is applied; defects of parapet walls, copings, chimneys, skylights, vents, supports or other parts of the building; or fire. If the roof is damaged by reason of any of the foregoing this guarantee shall thereupon become null and void for the balance of the guarantee period unless such damage is repaired by the Contractor at the expense of the party requesting such repairs.
- 2) This guarantee is in lieu of all other guarantees, express or implied, including any warranties of merchantability or fitness for a particular use. Nothing in this instrument shall render the Contractor liable for consequential damages to the building or contents resulting from any faults or defects in material or workmanship.
- 3) No work shall be done on said roof, including, but without limitation, openings made for flues, vents, drains, sign brackets or other equipment fastened to or set on the roof, unless the Contractor shall be first notified, shall be given the opportunity to make the necessary roofing application recommendations with respect thereto, and such recommendations are complied with. Failure to observe this condition shall render this guarantee null and void. The Contractor shall be paid for time and material expended in making recommendations or repairs occasioned by the work of others on said roof.
- 4) The Owner has the right, at any time during this guarantee to make emergency repairs to protect the contents of the building or the building itself from damage due to leaking. The cost of these emergency repairs shall be borne by the Contractor.
- 5) This guarantee shall not be or become effective unless and until the Contractor has been paid in full for said roof in accordance with the agreement pursuant to which such roof was applied.
- 6) Additional conditions or exclusions: None

In Witness Whereof, this instrument has been duly executed this _____ day

of

_____, 201_____.

Authorized Signature

SECTION 075423 - THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.

1.2 DEFINITIONS

- ##### A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.3 ACTION SUBMITTALS

- ##### A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- ##### A. Research/Evaluation Reports: For components of roofing system, from ICC-ES.
- ##### B. Sample Warranties: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

- ##### A. Maintenance Data: For roofing system to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- ##### A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

- ##### A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain components including roof insulation and fasteners] for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- B. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- C. Roofing System Design: UL Class 90.
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 TPO ROOFING

- A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible TPO sheet.
 - 1. Thickness: 60 mils (1.5 mm) >, nominal.
 - 2. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Slip Sheet: Manufacturer's standard, of thickness required for application.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

- F. Miscellaneous Accessories: Provide metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

PART 3 - EXECUTION

3.1 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.2 ADHERED ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
- B. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- D. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- F. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.3 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.4 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 074625 - WOOD SHINGLE AND SHAKE SIDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood-shingle siding.
 - 2. Felt weather-resistive barrier.
 - 3. Flexible flashing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and finish specified.

1.3 QUALITY ASSURANCE

- A. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label siding for compliance with referenced grading rules.

1.4 WARRANTY

- A. Special Materials Warranty: Manufacturer's warranty administered by CSSB and on CSSB's standard form in which Manufacturer agrees to repair or replace CSSB-labeled products that fail in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.
 - 1. Materials Warranty Period: Limited lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Grading Rules: Provide siding that complies with CSSB's grading rules for products indicated.
 - 1. Identification: Attach a label to each bundle of siding that identifies manufacturer, type of product, grade, dimensions, and identification mark of grading agency.

2.2 UNDERCOURSING

- A. Cedar Undercoursing Shingles: Smooth-sawn western red cedar shingles.
 - 1. Size: Length matching exposed siding and in manufacturer's standard thickness.
 - 2. Grade: Undercoursing.
 - 3. Finish: Match exposed siding

2.3 EXPOSED SHINGLE SIDING

- A. Rebutted-and-Rejointed Cedar Shingles: Smooth-sawn western red cedar shingles.
 - 1. Grade: No. 1.
 - 2. Size: 16 inches (406 mm) long; 0.40 inch (10 mm) thick at butt.
 - 3. Finish: Unfinished.

2.4 ACCESSORIES

- A. Felt Weather-Resistive Barrier: 30#, ASTM D 4869/D 4869M, Type III, asphalt-saturated organic felt, nonperforated.
- B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable rubberized-asphalt compound bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin.
 - 1. Minimum Overall Thickness: 0.040 inch (1.0 mm).
 - 2. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for applicable substrate.
- C. Nails: ASTM F 1667, stainless-steel, Type 316, wire nails, sharp pointed, and of sufficient length to penetrate a minimum of 3/4 inch (19 mm) into sheathing.
 - 1. Shingles: Use box or casing nails.
 - 2. Felt Weather-Resistive Barrier: Use roofing nails.
 - 3. Nails in Contact with Metal Flashing: Use nails made from same metal as flashing.

PART 3 - EXECUTION

3.1 FELT WEATHER-RESISTIVE BARRIER INSTALLATION

- A. General: Comply with felt manufacturer's written installation instructions and CSSB recommendations applicable to products and applications indicated unless more stringent requirements apply.
 - 1. Apply horizontally with a 2-inch (51-mm) overlap and a 6-inch (152-mm) end lap. Wrap around inside and outside corners 4 inches (102 mm).

3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing to comply with manufacturer's written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.

3.3 SINGLE-COURSED WALLS

- A. Install products according to manufacturer's written instructions and recommendations in CSSB's "Exterior and Interior Wall Manual."
- B. Starter Undercourse: Install a single course of undercoursing at the base of the wall in a continuous straight line.
- C. Exposed Siding: Install starter (first) course of exposed siding over starter undercourse with butts 1/2 inch (13 mm) lower than undercourse butts.
 - 1. Install exposed siding courses with butt lines even.
 - 2. Exterior Corner Treatment: Laced
- D. Weather Exposure and Spacing:
 - 1. Shingles:
 - a. Maintain maximum weather exposure of 6 inches.
 - b. Space shingles 1/8 to 1/4 inch (3 to 6 mm) apart.

END OF SECTION 074625

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes hollow-metal work.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.3 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm).
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum G90 coating.
 - d. Edge Construction: Model 1, Full Flush
 - e. Core: Manufacturer's standard insulation material.
 - 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum G90 coating.
 - b. Construction: Full profile welded.
 - 4. Exposed Finish: Prime.

2.2 FRAME ANCHORS

- A. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.3 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).
- I. Glazing: Section 088000 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat.

2.4 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 1. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

2. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 3. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
 - a. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - b. Install frames with removable stops located on secure side of opening.
 - c. Install door silencers in frames before grouting.
 - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - f. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
 6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
 8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- B. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: [3/4 inch (19.1 mm)] [5/8 inch (15.8 mm)] plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.
- E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on [**exterior substrates as indicated on the drawings:**

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, **provide product** listed in the Exterior Painting Schedule for the paint category indicated.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: **As selected by Architect/Owner from manufacturer's full range.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

- A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

- A. Galvanized-Metal Substrates:
 - 1. Latex:
 - a. Prime Coat: Factory Primed
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), **MPI #11**.
- B. Wood Substrates: **Wood trim**.
 - 1. Latex System **MPI EXT 6.3A**:
 - a. Prime Coat: Primer, alkyd for exterior wood, **MPI #5**.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), **MPI #11**.

END OF SECTION 099113

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bronze ball valves.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of valve indicated.

1.3 QUALITY ASSURANCE

A. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.9 for building services piping valves.

- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.

- B. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.

- C. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.
- D. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- E. Valve Sizes: Same as upstream piping unless otherwise indicated.
- F. Valve-End Connections:
 - 1. Solder Joint: With sockets according to ASME B16.18.
 - 2. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Valve, Inc.
 - b. Conbraco Industries, Inc.; Apollo Valves.
 - c. Crane Co.; Crane Valve Group; Crane Valves.
 - d. Hammond Valve.
 - e. Lance Valves; a division of Advanced Thermal Systems, Inc.
 - f. Legend Valve.
 - g. Milwaukee Valve Company.
 - h. NIBCO INC.
 - i. Red-White Valve Corporation.
 - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
 - 2. Description:
 - a. Standard: MSS SP-110.
 - b. SWP Rating: 150 psig.
 - c. CWP Rating: 600 psig.
 - d. Body Design: Two piece with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.
 - e. Body Material: Bronze ASTM B 584 Alloy C844.
 - f. Ends: Threaded or Solder.
 - g. Seats: PTFE or TFE.
 - h. Stem: Bronze.
 - i. Ball: Chrome-plated brass.
 - j. Port: Full.
 - k. Locking type only for shut-off service to emergency fixtures/equipment.

PART 3 - EXECUTION

3.1 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.2 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
 - 1. Shutoff Service: Ball.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
 - 1. For PVC or Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

3.3 DOMESTIC, COLD-WATER VALVE SCHEDULE

- A. Pipe NPS 2 and Smaller:
 - 1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.

END OF SECTION 220523

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings and up to and including 5'-0" from building.

1.2 RELATED SECTIONS

- A. Division 22 Section "Domestic Water Piping Specialties"
- B. Division 31 Section "Earth Moving"

1.3 INFORMATIONAL SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

1.4 PROJECT CONDITIONS

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
 - 1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
 - 2. Do not proceed with interruption of water service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

2.2 COPPER TUBE AND FITTINGS

- A. Soft Copper Tube: ASTM B 88, Type L water tube, annealed temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

- D. Schedule 40 PVC ASTM 1785 for pressure pipe and pressure fittings only.

2.3 PIPING JOINING MATERIALS

- A. Solder Filler Metals: ASTM B 32, lead-free alloys.
- B. Flux: ASTM B 813, water flushable.
- C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 TRANSITION FITTINGS

A. General Requirements:

- 1. Same size as pipes to be joined.
- 2. Pressure rating at least equal to pipes to be joined.
- 3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Plastic-to-Metal Transition Fittings:

- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Basis-of-Design Product: Subject to compliance with requirements, provide comparable product by one of the following:
 - a. Charlotte Pipe and Foundry Company.
 - b. Harvel Plastics, Inc.
 - c. Spears Manufacturing Company.
- 3. Description:
 - a. CPVC PVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions.
 - b. One end with threaded brass insert and one solvent-cement-socket or threaded end.

D. Plastic-to-Metal Transition Unions:

- 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
- 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Colonial Engineering, Inc.
 - b. NIBCO Inc.
 - c. Spears Manufacturing Company.
- 2. Description:
 - a. CPVC four-part union.
 - b. Brass threaded end.
 - c. Solvent-cement-joint or threaded plastic end.
 - d. Rubber O-ring.
 - e. Union nut.

- E. Sleeve-Type Transition Coupling: AWWA C219.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Cascade Waterworks Manufacturing.
 - b. Dresser, Inc.; Dresser Piping Specialties.
 - c. Ford Meter Box Company, Inc. (The).
 - d. JCM Industries.
 - e. Romac Industries, Inc.
 - f. Smith-Blair, Inc; a Sensus company.
 - g. Viking Johnson; c/o Mueller Co.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Division 31 Section "Earth Moving" for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing underground according to CDA's "Copper Tube Handbook."
- C. Install shutoff valve. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties."
- D. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- E. Install piping protected from physical contact by building occupants unless otherwise indicated.
- F. Install piping to permit valve servicing.
- G. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Soldered Joints on Piping Less than 2-1/2-inches Only: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- G. PVC joints shall be made according to the manufacturer instructions for the pipe and as instructed by the manufacturer of the glue and primer cleaner required for PVC joints on ASTM 1785 pressure pipe and fittings.
- H. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.4 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.
- B. Install shutoff valve close to water main at each riser serving ground hydrant fixtures.

3.5 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
 - 1. Fittings for NPS 2" and Smaller: Fitting-type coupling.
- C. Transition Fittings in Belowground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping for ground hydrant, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the ground hydrant.

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Division 22 Section "Identification for Plumbing Piping and Equipment."
- B. Provide signage to indicate "Non-Potable Water Not for Drinking" at each ground hydrant location.

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:

- 1. Piping Inspections:

- a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
- b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
 - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
 - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
- c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
- d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

- 2. Piping Tests:

- a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
- b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
- c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
- d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
- e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
- f. Prepare reports for tests and for corrective action required.

- B. Domestic water piping will be considered defective if it does not pass tests and inspections.

- C. Prepare test and inspection reports.

3.9 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.
 - a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
 - b. Adjust calibrated balancing valves to flows indicated.
5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.10 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
 - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Repeat procedures if biological examination shows contamination and does not provide two good batch samples within 48 hours.
 - e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.11 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Domestic water, building-service piping, shall be the following:
 - 1. Soft copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed joints, from isolation valve to ground hydrant.
 - 2. PVC Schedule 40, ASTM 1785 for pressure only.
- D. Main incoming domestic water service below grade, shall be PVC Schedule 40, ASTM 1785 for pressure only.

3.12 VALVE SCHEDULE

- 1. Drawings indicate valve types to be used. Coordinate with Division 22 Section “General Duty Valves for Plumbing”.

END OF SECTION 221116

SECTION 260500 – ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions, Supplementary General Conditions, and Special Conditions of this Contract form a part of this Division of Specification.
- B. This section forms a part of all sections under Division 26 Electrical.
- C. Requirements herein augment or clarify articles specified under aforementioned General and Special Conditions.

1.2 QUALIFICATIONS FOR BIDDERS

- A. Before submitting bid, visit the site and examine all adjoining existing equipment and space conditions on which work is in any way dependent, for the best workmanship and operation according to the intent of specifications and drawings. Report to the Engineer any condition which might prevent the installation of the equipment in the manner intended.

1.3 CODES AND STANDARDS

- A. Latest effective publications of following standards, codes, etc., as they apply, form part of these specifications as if were written fully herein and constitute minimum requirements. Minimum requirements shall not relieve the Contractor of the responsibility of furnishing and installing higher grade materials and workmanship than herein specified. The following will be referred to throughout in abbreviated forms.
 - 1. National Electrical Code, (NFPA 70) (NEC)
 - 2. Standard Rules of Institute of Electrical and Electronic Engineers (IEEE)
 - 3. Rules and Regulations of Local Electric Utility Company
 - 4. Applicable Standards of the National Electrical Manufacturer's Association (NEMA)
 - 5. Applicable Standards of the American National Standards Institute (ANSI)
 - 6. Applicable Local Codes
 - 7. North Carolina Building Code
 - 8. Applicable Standards and Lists of the Underwriter's Laboratories, Inc. (UL)
 - 9. Applicable Standards of the National Fire Protection Association (NFPA)
 - 10. International Building Code (IBC)
 - 11. The Americans with Disabilities Act (ADA)
 - 12. International Electrical Testing Association (NETA)

1.4 SCOPE OF WORK

- A. Provide all work required for this Division including all labor, materials, equipment, appurtenances and services to provide complete electrical systems as shown on the drawings and specified in this Division of the specifications. The word "Provide" shall mean "Furnish and Install Complete and Ready for Use". The work includes, but is not limited to the following:
 - 1. Interior and exterior electrical lighting system including fixtures, lamps, time switches, photoelectric cells, contactors and other control devices and equipment.

2. Power wiring system, including outlets, receptacles, switches, wire, conduit, junction boxes, panelboards and new electric service.
3. Disconnect switches and power wiring up to and including motor connections for all equipment provided under other Divisions of this specification shall be included in this Division. Motor controllers and motor starters furnished under other Divisions shall be set in place and connected to source and load under this Division. In general, motors will be provided with the equipment they drive and are not part of this work under this Division, except that they shall be connected hereunder.
4. Temporary Construction Power.

B. The following work is not included in this Division:

1. Irrigation equipment and all associated motors and magnetic motor starters.
2. Plumbing equipment except as specifically indicated.
3. Control, interlock, and internal equipment wiring regardless of voltage.

1.5 DRAWINGS AND SPECIFICATIONS

- A. The drawings are diagrammatic and indicate the general extent, character and arrangement of equipment, fixtures and conduit and wiring systems. If any departures from the contract drawings are deemed necessary, submit details of such departures and the reasons therefore as soon as practicable after award of contract to the Engineer for approval. Make no such departures without prior written approval of the Engineer.
- B. It is the intention of these specifications and drawings to fully cover all work and materials for a complete, first-class electrical installation, and any devices such as pull boxes and disconnect switches, usually employed in this class of work, though not specifically mentioned or shown on the drawings or in this specification, but which may be necessary for the satisfactory completion of the work, shall be furnished and installed by the Contractor as a part of his total work under this Division. Consult the specifications and drawings of all other trades and perform all electrical work required therein. Cooperate with all other contractors or subcontractors to furnish complete workable systems.
- C. In case of conflicting information on the drawings and/or in the specifications, the proper interpretation shall be made by the Engineer.
- D. Disagreements occurring between trades covering various phases of the work shall be referred to General Contractor for final decision.
- E. Changes and additions to scope of the work under this contract shall be submitted to the Engineer and his written approval obtained before proceeding with the changed work.
- F. During construction, the Electrical Subcontractor shall keep an accurate record of all deviations between the work as shown on the contract drawings and that which is actually installed. He shall secure a set of blue line prints of the electrical drawings for this purpose, and note changes thereon with red marks, in a neat and accurate manner, thus making a complete record of all changes and revisions in the original design which exist in the completed work. The cost of furnishing above prints and preparing these record drawings shall be borne by the subcontractor, and shall be included in the contract price. When all revisions have been shown on these prints to indicate the work as finally installed, the prints shall be delivered to the Engineer, before final payment.

1.6 PERMITS, INSPECTION AND TESTS

- A. The right is reserved to inspect and test any portion of the installation/equipment during the progress of its installation. Test all wiring for continuity and grounds before connecting any fixtures or devices. Perform insulation resistance tests on wiring #6 or larger. Test the entire system when the work is finally

completed to insure that all portions are free from short circuits and grounds. Provide all equipment necessary to conduct the above tests.

- B. Secure and pay for all required permits and inspections. Inspection certificates from local authorities having jurisdiction shall be delivered to the Owner before final payment.

1.7 SUBMITTALS

- A. Submit Shop Drawings, Product Data and Samples within thirty (30) days of award of contract and in accordance with the General Conditions and Supplementary Conditions. All interdependent equipment, i.e. lighting fixtures and lighting controls shall be submitted simultaneously. Review of submittals by the Engineer and any associated action taken by the Engineer does not relieve the contractor of any requirements set forth by the contract documents. Submittals are required for the following items if and only if those items are specified herein.

- 1. Panelboards
- 2. Circuit Breakers
- 3. Lighting Fixtures
- 4. Lighting Controls

- B. Submittals shall contain:

- 1. The date of submission and of any previous submissions.
- 2. The project title and number.
- 3. Contract or project identification.
- 4. The names of:
 - a. Contractor.
 - b. Supplier.
 - c. Manufacturer.
- 5. Identification of the product, and specification section.
- 6. Field dimensions, clearly identified as such.
- 7. Relation to adjacent or critical features or materials.
- 8. Applicable standards.
- 9. Identification of deviations from Contract Documents.
- 10. Identification of non-complying features and reason for the non-compliance. The reason shall be specific in nature.
- 11. Identification of revisions on resubmittals.
- 12. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

C. SUBSTITUTIONS

- 1. For a period of 10 days after Contract date, Engineer will consider written requests from Contractor for substitution of products.
- 2. Submit a separate request for each product, supported with complete data, with drawings and samples as appropriate, including:
 - a. Comparison of the proposed substitution with that specified.
 - b. Changes required elsewhere because of the substitution.
 - c. Effect on the construction schedule.
 - d. Cost comparison of the substitution and product specified.
 - e. Availability of maintenance service, and replacement parts.

3. The Engineer shall be the judge of the acceptability of the proposed substitution.
4. A request for a substitution constitutes a representation that the Contractor:
 - a. Has investigated the proposed product and determined that it is equal to or superior in all respects to that specified.
 - b. Will provide the same warranties or bonds for the substitution as for the product specified.
 - c. Will coordinate the installation of an accepted substitution into the work, and make such other changes as may be required to make the work complete in all respects.
 - d. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

PART 2 - PRODUCTS

2.1 MANUFACTURING STANDARDS

- A. Materials shall be new and approved and labeled by UL wherever standards have been established by that agency. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Engineer. Materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design. All items of the same type and rating shall be identical.

2.2 TRADE NAMES

- A. Unless specifically identified otherwise, manufacturers' names and catalog numbers indicated herein and on the drawings are not intended to be proprietary designations. They are to indicate general type and quality of materials and equipment required. Equipment and materials by other manufacturers which in the opinion of the Engineer are of equal quality and which will produce the same results with regard to both their ability to perform the required technical functions as well as to their appearance in the specific location on this project will be considered.

2.3 MOTORS AND EQUIPMENT

- A. All motors shall have disconnecting means, controller and thermal overload protection.
- B. Provide motors, controllers, integral disconnects, and contactors with their respective pieces of equipment. Motors, controllers, integral disconnects, and contactors shall conform to the requirements defined under the same specification division specifying the equipment. If there is no specification for motors and controllers under the division specifying the equipment, then motors and controllers shall be as defined under the electrical provisions of the specifications. Extended voltage range motors shall not be permitted. Control voltage for controllers and contactors shall not exceed 120 volts nominal. When motors and equipment furnished are larger than sizes indicated, the cost of additional electrical service and related work shall be included under the section that specified that motor or equipment. Where fuse protection is specifically recommended by the equipment manufacturer, provide fused switches in lieu of non-fused switches indicated.
- C. Provide internal wiring for components of packaged equipment as an integral part of the equipment. Provide power wiring and conduit for field-installed equipment under the electrical provisions of the contract. Control wiring and conduit shall be provided under the section specifying the associated equipment. Wiring and conduit for power systems and control systems shall conform to the requirements defined under the electrical provisions of the specifications.

2.4 ELECTRICAL SERVICE

- A. Provide the electrical service as indicated. All arrangements shall be as indicated with proper extension, terminations, provisions and necessary materials for final connections by the local power company. Service and all metering shall be provided in accordance with the latest regulations of the local power company. The local power company may provide the meter and current transformers and may participate in the cost of supplying service to the building. Consult the local power company and determine limit of this participation. The bid on electrical work shall reflect this participation except that any charges which the local power company proposes to make for supplying service will be paid directly by Owner and will not be part of this contract.
- B. Short circuit ratings for all panelboards, main disconnect switches, etc. shall be suitable to accommodate the Power Company's available fault current. Contractor shall provide label on service equipment stating available fault current and the date it was calculated.

2.5 TEMPORARY ELECTRICAL SERVICE

- A. Provide temporary electrical service at 240/120 volts, 60 Hertz, 1-phase, 3-wire on the building site during construction until permanent service is activated. Make all necessary arrangements with the local power company for this temporary service. General Contractor will pay all charges which may be made by the local power company.

2.6 GROUNDING

- A. The entire electrical system, including equipment frames, conduit, switches, controllers, wireways, neutral conductors, and all other such equipment shall be permanently and effectively grounded in accordance with the NEC. Ground rods shall be copper clad steel, 3/4" diameter by 10'-0" long. Provide a separate insulated ground conductor in all branch circuit conduits sized in accordance with the N.E.C.

PART 3 - EXECUTION

3.1 SCHEDULE OF WORK

- A. The schedule of the electrical work shall be arranged to suit the progress of work by the other trades and shall in no way retard progress of construction of the project.
- B. Work under this Division shall proceed in advance of the work of others whenever possible, eliminating all cutting and patching. When such procedure is impossible, cutting and patching shall be done in an approved manner. Cutting shall not endanger structural integrity in any way. Patching shall exactly match contiguous work. Actual work of cutting and patching of existing surfaces shall be performed by the subcontractor who originally prepared these surfaces, e.g., cutting and patching of masonry wall will be performed by the masonry subcontractor. Costs of such cutting and patching shall be borne by the Electrical contractor. Cutting shall be carefully done and damage to building, piping, wiring or equipment as a result of cutting shall be repaired by skilled mechanics of trade involved.

3.2 STORAGE AND MATERIALS

- A. Space will be assigned to the Contractor by the Owner for the storage of materials. This Contractor will be responsible for the protection and safekeeping of materials, tools, and equipment. All materials and equipment shall be kept in its assigned place until the time of its installation. Excess materials, dirt and refuse shall be promptly removed from the work site.

3.3 LABELING OF EQUIPMENT

- A. All panelboards, cabinets and safety switches shall be identified by machine engraved laminated plastic designation plates permanently attached thereto with self-tapping screws or rivets. All component parts of each item of equipment or device shall bear the manufacturer's nameplate, giving name of manufacturer, description, size, type, serial and model number and electrical characteristics in order to facilitate maintenance or replacement. The nameplate of a subcontractor or distributor will not be acceptable. Self-adhesive, plastic laminate labels are not acceptable.
- B. All panelboards shall be field marked to warn personnel of the potential for Arc Flash. Labels shall state "WARNING – ARC FLASH AND SHOCK HAZARD APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIRED".

3.4 OTHER TRADES

- A. Excavation shall be performed in accordance with the section of these specifications which cover excavating, filling and backfilling.
- B. Concrete work shall be performed in accordance with the section of these specifications which cover concrete.
- C. Painting shall be performed in accordance with the section of these specifications which cover painting. Paint all exposed conduit as well as cabinets and related items which are not supplied with a factory finish. Touch up all factory finishes damaged during installation or by adjacent construction work.

3.5 COORDINATION

- A. Cooperate and coordinate efforts with all Contractors on the project. This is especially important in determining exact locations of all switches, receptacles and lighting fixtures. Verify ceiling and wall construction and material prior to ordering lighting fixtures or other devices to ensure proper fixture or device is furnished to match construction. This verification must be executed regardless of information placed on the drawings. Any cost incurred which in the opinion of the Engineer, could have been avoided by this step shall be the responsibility of the Contractor.
- B. Carefully check space requirements with the other subcontractors to insure that electrical equipment can be installed in the spaces allotted for them. Sufficient access and working space shall be provided and maintained about all electrical equipment as required by the National Electrical Code. Consult all applicable drawings for details. Where interferences occur and work must be relocated, relocate without additional cost.
- C. No conduit, outlet box, conduit stub-up, or any other electrical devices shall be installed until the exact location has been determined by the coordinated effort of all Subcontractors and other parties concerned. Any relocating of devices or cutting or patching which becomes necessary due to improper coordination shall be done at this Contractor's expense.
- D. Determine electrical requirements of other Divisions in order to fully understand wiring, and provide as required for complete and satisfactory operation of project. Make connections for other Divisions where indicated.
- E. Obtain approved shop drawings showing wiring diagrams, connection diagrams, roughing-in and hookup details, from other involved contractors for all equipment and comply therewith.

3.6 GUARANTEE OF WORK

- A. Contractor guarantees by his acceptance of the contract that all work installed is free from any and all defects in workmanship and/or materials, and that the apparatus will develop capacities and characteristics specified, and that if, during the period of one year or as otherwise specified, from date of certificate of completion and acceptance of the work any such defects in workmanship, material or performance appear, he will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from Engineer. In default thereof, the Owner may have such work done and charge cost to Contractor. Equipment guarantees from date of "start-up" will not be recognized.
- B. Comply, also, with the General Conditions and the Supplementary Conditions and the applicable Sections of Division 01 General Requirements.
- C. Provide service for the installation for one year from date of final acceptance. This shall include all emergency service and adjustment. Provide evidence upon request by the Engineer that a factory authorized local service organization is in existence to service and furnish spare and replacement parts for all equipment under this Division of the specifications.
- D. Compile and assemble and provide all shop drawings, maintenance manuals, operation manuals and warranties in a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

3.7 CLEANING

- A. Refer to Division 01 closeout procedures or final cleaning sections for general requirements for final cleaning.
- B. Clean all light fixtures, lamps and lenses prior to final acceptance. Replace all inoperative lamps.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.
- B. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Types THW-2, THHN-2-THWN-2, and XHHW-2.
- C. Multiconductor cable shall not be allowed.

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-2-THWN-2, single conductors in raceway or Type XHHW-2, single conductors in raceway.
- B. Feeders and Branch Circuits: Type THHN-2-THWN-2, or XHHW-2 single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS

- A. Conceal conduits in finished walls, ceilings, and floors, unless otherwise indicated.

- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used shall not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway. Conductors #8 and smaller shall be pulled by hand and without aid of block and tackle or other mechanical device. Only approved equipment for pulling conductors shall be used for #6 and larger conductors.
- D. Install exposed conduits parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test all conductors #6 and larger for continuity and insulation resistance.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification.
- B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Grounding and bonding systems and equipment.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.

2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch in diameter by 10 feet in length.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, size as indicated. Bury at least 24 inches below grade.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductor in all feeder and branch circuits.
- B. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 12 inches below finish grade unless otherwise indicated.
 - 1. Interconnect ground rods as required to achieve required maximum resistance with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

D. Grounding Electrode System: All grounding electrodes that are present at each building or structure served shall be bonded together to form the grounding electrode system. This shall include the following:

1. The metal frame of the building or structure that is connected to the earth.
2. An electrode encased by at least 2 in. of concrete, located horizontally near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth.
3. Ground rod.

3.5 LABELING

A. Comply with specified requirements. The label or its text shall be green.

B. Install labels at the grounding electrode conductor where exposed.

1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 2. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 3. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1, NECA 101 and NECA 120.
- C. Conduit Support Devices: Steel for indoor and malleable-iron with nest-back for exterior hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black, galvanized, and stainless.

- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 6. Toggle Bolts: All-steel springhead type.
 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1, NECA 101 and 120 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for conduits as maximum of 8 feet on center. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1, NECA 101 and 120 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structural members, as permitted in NFPA 70.
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 6. To Steel: Beam clamps complying with Spring-tension clamps.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete unless otherwise noted on drawings.
- C. Anchor equipment to concrete base.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Conduits, tubing, and fittings.
 2. Boxes, enclosures, and cabinets.
 3. Handholes and boxes for exterior underground cabling.

1.2 ACTION SUBMITTALS

- A. Product Data: For raceways, wireways and fittings, and cabinets.

PART 2 - PRODUCTS

2.1 METAL CONDUITS, TUBING, AND FITTINGS

- A. Liquidtight Flexible Metal Conduit (LFMC): Flexible steel conduit with PVC jacket and complying with UL 360.
- B. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

2.2 NONMETALLIC CONDUITS, TUBING, AND FITTINGS

- A. Listing and Labeling: Nonmetallic conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- C. Fittings for RNC: Comply with NEMA TC 3; match to conduit type and material.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb shall be listed and marked for the maximum allowable weight.
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

- E. Device Box Dimensions: Except as noted hereinafter minimum size outlet box shall be 4" square, 1 1/2" deep, and shall be increased in dimensions to accommodate conductors, conduits, and devices as required by the NEC. Shallower boxes may be used where required by structural conditions and when specifically approved by the Architect/Engineer. Provide raised ring to accommodate the wiring device.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
 - 1. Standard: Comply with SCTE 77.
 - 2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
 - 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
 - 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - 5. Cover Legend: Molded lettering, "ELECTRIC" or as otherwise required for description of system wiring.
 - 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 - 1. Aboveground Conduit: RNC, Type EPC-40-PVC.
 - 2. Underground Conduit: RNC, Type EPC-40-PVC, direct buried minimum 24" below finished grade.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X.
- B. Indoors: Apply raceway products as specified below unless otherwise indicated.
 - 1. Exposed or Concealed: RNC, Type EPC-40-PVC.
 - 2. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 3. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4X in damp or wet locations.
- C. Minimum Raceway Size: 1/2-inch above grade or finish floor and 3/4-inch below grade, below floor, or in concrete floor, unless otherwise noted.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

3.2 INSTALLATION

- A. Comply with NECA 1, NECA 101 and NECA 120 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- B. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- C. Install no more than the equivalent of three 90-degree bends in any conduit run. Support within 12 inches of changes in direction.
- D. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- E. Support conduit within 12 inches of enclosures to which attached.
- F. Raceways Beneath Floor Slabs:
 1. Conduit shall not be run in the floor slab. Do not stack conduits beneath slab.
 2. Conduit run beneath slab shall be properly suspended from slab such that sub-slab settlement will not adversely affect electrical system.
- G. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
- H. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors No. 4 AWG and larger.
- I. Install pull wires in empty raceways. Use polypropylene line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- J. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.
- K. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 1. Where an underground service raceway enters a building or structure.
 2. Where otherwise required by NFPA 70.
- L. Expansion-Joint Fittings:
 1. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per degree F of temperature change for PVC conduits.
 2. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

- M. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for motors.
 - 1. Use LFMC in damp or wet locations.
- N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.
- O. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- P. Locate boxes so that cover or plate will not span different building finishes.
- Q. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- R. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit.
 - 2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
 - 3. Underground Warning Tape: Comply with requirements in Division 26 Section "Identification for Electrical Systems."

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line, 24 inch minimum below grade.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

END OF SECTION 260533

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Instruction signs.
6. Equipment identification labels.
7. Miscellaneous identification products.

1.2 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 DETECTABLE UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

2.3 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Fasteners for Equipment Identification Labels, and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Attach all signs and labels with mechanical fasteners appropriate to the location and substrate.

D. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 12 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box with the circuit number and panelboard of circuits within.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes, and handholes, use color-coding to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit. Color shall be factory applied for sizes No. 8 AWG and smaller.
 - b. Colors for 240/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Neutral: White.
 - 4) Ground: Green.
 - c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- C. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, control wiring and optical fiber cable.
 1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- D. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- E. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label or stenciled legend 4 inches high.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 260553

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Time switches.
 - 2. Lighting control equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawing: Submit floor plan with manufacturer recommended layout placement and wiring for the indoor occupancy sensors and switchbox – mounted occupancy sensors.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Electronic Time Switches: Solid state, astronomical programmable, with alphanumeric display; complying with UL 917.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Automatic daylight savings time changeover.
 - 3. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Description: Solid state, with dry contacts rated configuration and rating as indicated complying with UL 773.
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
 - 2. Light-Level Monitoring Range: 1.5 to 10 fc, with an adjustment for turn-on and turn-off levels within that range.
 - 3. Time Delay: Thirty-second minimum, to prevent false operation.

2.3 LIGHTING CONTACTORS

- A. Description: Electrically operated and mechanically held, unless otherwise indicated, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 20 percent or less total harmonic distortion of normal load current).
2. Enclosure: Comply with NEMA 250, Type 1 unless otherwise indicated on the drawings
3. Provide with control and pilot devices as indicated on Drawings, matching the NEMA type specified for the enclosure.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas where installed. Do not exceed coverage limits specified in manufacturer's written instructions.
- B. Mount lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections.
 1. Operational Test: After installing control devices and sensors, and after electrical circuitry has been energized, operate to confirm proper unit operation.
 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Lighting control devices will be considered defective if they do not pass tests and inspections.

END OF SECTION 260923

SECTION 262416 – PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 6. Include wiring diagrams for power, signal, and control wiring.
- C. Panelboard schedules for installation in panelboards.

1.3 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA PB 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Flush- and surface-mounted cabinets as indicated.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1, unless otherwise noted on drawings.

- b. Outdoor Locations: NEMA 250, Type 3R, unless otherwise noted on drawings.
- 2. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
- 3. Directory Card: Inside panelboard door, mounted in transparent card holder.
- B. Incoming Mains Location: Top or bottom.
- C. Phase, Neutral, and Ground Buses: Tin-plated aluminum or copper.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Main and Neutral Lugs: Mechanical type.
 - 2. Ground Lugs and Bus Configured Terminators: Mechanical type.
- E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.
- F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION AND LIGHTING AND APPLIANCE BRANCH CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type or lighting and appliance branch circuit type as required..
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
- D. Main Circuit Breaker: Thermal-magnetic circuit breaker, inverse time-current element and adjustable instantaneous magnetic trip element.
- E. Branch Overcurrent Protective Devices: Bolt-on circuit breakers.

2.3 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, fully rated with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits.
 - a. GFI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (5-mA trip).
 - b. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
 - 2. Molded-Case Circuit-Breaker (MCCB) Features and Accessories, provide as required or indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Receive, inspect, handle, store and install panelboards and accessories according to NEMA PB 1.1.
- B. Mount top of trim so that the handle on any breaker does not exceed 78".
- C. Mount panelboard cabinet plumb and rigid without distortion of box.
- D. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- E. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable. Update any existing panelboard directories affected by work under this contract.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Receptacles, switches, and associated device plates.
 2. Weather-resistant receptacles.
 3. Wall-box dimmers.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Subject to compliance with requirements, provide products by one of the following manufacturers:
1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 3. Leviton Mfg. Company Inc. (Leviton).
 4. Pass & Seymour/Legrand (Pass & Seymour).

2.2 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

2.3 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596. Device shall be "specification" grade.

2.4 GFI RECEPTACLES

- A. General Description:
1. Straight blade.
 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.

2.5 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

- B. Switches, 120/277 V, 20 A.

2.6 WALL-BOX DIMMERS

- A. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.
- B. LED Dimming Switches: Compatible with LED drivers, capable of consistent dimming with low end not greater than 10 percent of full brightness.

2.7 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material: Galvanized steel.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, "in use" type, complying with NEMA Type 3R, weather-resistant.

2.8 FINISHES

- A. Device Color:
 - 1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
 - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
 - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates, where possible.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test ground-fault receptacles with a "load" (such as a plug in light) to verify that the "line" and "load" leads are not reversed.

B. Wiring device shall be considered defective if it does not pass tests and inspections.

END OF SECTION 262726

SECTION 262813 – FUSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Cartridge fuses rated 600-V ac and less for use in control circuits and enclosed switches.

1.2 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA FU 1 for cartridge fuses.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussmann, Inc.
 - 2. Edison Fuse, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Littelfuse, Inc.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

PART 3 - EXECUTION

3.1 FUSE APPLICATIONS

- A. Motor Branch Circuits or Power Feeders: Class RK5, dual element time delay.
- B. Control Circuits: Class CC, time delay.

3.2 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.3 IDENTIFICATION

- A. Install labels complying with requirements for identification as specified and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

3.4 SPARE FUSES

- A. At the completion of the project the contractor shall deliver to the Owner (and obtain receipt for) spare fuses of each size and type equal to 20 percent of the number installed but not less than 3 or more than 9 of any size and type.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Enclosures.

1.2 SUBMITTALS

A. Product Data: For each type of enclosed switch, accessory, and component indicated.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Type GD, General Duty, Single Throw, 240-V ac, 400 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with cartridge fuse interiors to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

B. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
3. Lugs: Suitable for number, size, and conductor material.

2.2 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. NEMA 250, Type 4X, unless otherwise noted.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install individual wall-mounted switches with tops at uniform height unless otherwise indicated.
- B. Install fuses in fusible devices.
- C. Comply with NECA 1.

3.2 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches will be considered defective if they do not pass tests and inspections.

END OF SECTION 262816

SECTION 265600 - LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior luminaires with lamps and ballasts.
 - 2. Poles and accessories.

1.2 SUBMITTALS

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, and finishes.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with IEEE C2, "National Electrical Safety Code."
- C. Comply with NFPA 70.

1.4 FIELD CONDITIONS

- A. Mark locations of exterior luminaires for approval by Owner prior to the start of luminaire installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide product indicated on Drawings or Engineer approved equal.

2.2 GENERAL REQUIREMENTS FOR LUMINAIRES

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Lateral Light Distribution Patterns: Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.

- D. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
- G. Exposed Hardware Material: Stainless steel.
- H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- I. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.
- J. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:
 - 1. White Surfaces: 85 percent.
 - 2. Specular Surfaces: 83 percent.
 - 3. Diffusing Specular Surfaces: 75 percent.
- K. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

2.3 FLUORESCENT BALLASTS AND LAMPS

- A. Ballasts for Low-Temperature Environments:
 - 1. Temperatures 0 Deg F and Higher: Electronic type rated for 0 deg F starting and operating temperature with indicated lamp types.
- B. Ballast Characteristics:
 - 1. Power Factor: 95 percent, minimum.
 - 2. Sound Rating: Class A.
 - 3. Total Harmonic Distortion Rating: Less than 20 percent.
 - 4. Electromagnetic Ballasts: Comply with ANSI C82.1, energy-saving, high power factor, Class P, automatic-reset thermal protection.
 - 5. Case Temperature for Compact Lamp Ballasts: 65 deg C, maximum.
 - 6. Transient-Voltage Protection: Comply with IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
- C. Low-Temperature Lamp Capability: Rated for reliable starting and operation with ballast provided at temperatures 0 deg F and higher.

2.4 LED DRIVERS

- A. LED Electronic Drivers shall be UL approved and shall have the following characteristics:
 - 1. Electronic with Input Voltage range as shown on the drawings $\pm 10\%$, 50/60 Hz, with primary fusing.

2. Output Drive Current shall be as noted on plans, +/- 5%.
3. Power Factor shall be >90% at full load with THD <20% at full load
4. Load regulation shall be +/- 1% from no load to full load
5. Output shall be isolated
6. Case temperature shall be rated for -40°C through +80°C and provided with thermal protection and self-limited short circuit and overload protection.
7. Driver Life Rating shall have less than 0.5% failure rate at the LED module's maximum L70 rated life.

B. Driver Manufacturer

Drivers shall be considered acceptable for approval as manufactured by the following LED Driver manufacturers.

1. Advance Transformer Co.
2. Magtech
3. Thomas Research Products (TRP)
4. Osram/Sylvania

2.5 LED FIXTURES

- A. Life Rating (L_{70}) – Provide L_{70} documentation, defined as time of operation (in hours) to 30% lumen depreciation (70% lumen maintenance), derived from temperature measurement testing under UL1598 environments and directly correlated to LED package manufacturers IESNA LM-80-08 data.
- B. Mechanical – Housing shall be designed specifically for use with LED components and incorporate high performance Thermal Management methods, i.e. heat sink(s). No active thermal management/cooling features (i.e. fans), etc. will be allowed. Luminaire configuration shall allow for modular replacement and/or field repair of all electrical components (i.e. LED modules, Drivers, etc.).
- C. LED Module Manufacturers

LED modules considered acceptable for approval are as manufactured by the following LED component (chip) manufacturers.

1. Nichia Corporation.
2. Cree, Inc
3. Philips LumiLED
4. Osram Opto Semiconductors

2.6 GENERAL REQUIREMENTS FOR POLES AND SUPPORT COMPONENTS

- A. Structural Characteristics: Comply with AASHTO LTS-6 and current building code.
 1. Wind-Load Strength of Poles: Adequate at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of speed indicated.
 2. Strength Analysis: For each pole, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.
- B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts unless otherwise indicated.
- C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.
 2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.
- D. Handhole: Oval-shaped, with minimum clear opening of 2-1/2 by 5 inches, with cover secured by stainless-steel captive screws.

2.7 POLE ACCESSORIES

- A. Base Covers: Manufacturers' standard metal units, arranged to cover pole's mounting bolts and nuts. Finish same as pole.

PART 3 - EXECUTION

3.1 LUMINAIRE INSTALLATION

- A. Comply with NECA 1.
- B. Install lamps in each luminaire.
- C. Fasten luminaire to structural supports.
- D. Coordinate layout and installation of luminaires with other construction.
- E. Adjust luminaires that require field adjustment or aiming.

3.2 POLE INSTALLATION

- A. Alignment: Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features unless otherwise indicated on Drawings:
 1. Fire Hydrants and Storm Drainage Piping: 60 inches.
 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer.
- D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 1. Use anchor bolts and nuts selected to resist wind loads defined for the application and approved by manufacturer.
 2. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 3. Install base covers unless otherwise indicated.
 4. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- E. Raise and set poles using web fabric slings (not chain or cable).

3.3 BOLLARD LUMINAIRE INSTALLATION

- A. Align units for optimum directional alignment of light distribution.
- B. Provide concrete base with top flush with finished grade or surface at bollard location. Finish by troweling and rubbing smooth.

3.4 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.5 GROUNDING

- A. Ground poles and support structures.
 - 1. Install grounding electrode for each pole.
 - 2. Install grounding conductor and conductor protector.
 - 3. Ground metallic components of pole accessories and foundations.

END OF SECTION 265600

SECTION 31 31 16 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Soil treatment with termiticide.

1.3 SUBMITTALS

- A. Product Data: For each type of termite control product.
 - 1. Include the EPA-Registered Label for termiticide products.
- B. Qualification Data: For qualified Installer.
- C. Product Certificates: For termite control products, from manufacturer.
- D. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
 - 1. Date and time of application.
 - 2. Moisture content of soil before application.
 - 3. Termiticide brand name and manufacturer.
 - 4. Quantity of undiluted termiticide used.
 - 5. Dilutions, methods, volumes used, and rates of application.
 - 6. Areas of application.
 - 7. Water source for application.
- E. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.
- B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
- B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.6 WARRANTY

- A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
 - 1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

- A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.
 - 1. Products: Subject to compliance with requirements. General style, type, quality and character are following .
 - a. BASF Corporation, Agricultural Products; Termidor.
 - b. Bayer Environmental Science; Premise 75.
 - c. FMC Corporation, Agricultural Products Group;
 - 2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than three years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.
- B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials 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 footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.
 - 1. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

3.3 APPLICATION, GENERAL

- A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

- A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.
 - 1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
 - 2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
 - 3. Crawlspace: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
 - 4. Masonry: Treat voids.
 - 5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.
- C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.
- D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 313116

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Standards set forth by the North Carolina Department of Environmental Quality (NCDEQ) Division of Energy, Mineral and Land Resources.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Removal of trees and other vegetation.
 - 2. Clearing and grubbing.
 - 3. Removing above-grade improvements.
 - 4. Removing below-grade improvements.
- B. Related Sections:
 - 1. Division 01 Section "Construction Waste Management".
 - 2. Division 31 Section "Earth Moving".
 - 3. Division 31 Section "Erosion Controls".

1.3 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 improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to property owners.
 - 3. All erosion control measures shall be in place prior to commencement of clearing operations.
- C. Protection of Existing Trees and Vegetation: 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. Provide temporary guards to protect trees and vegetation to be left standing.
 - 1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
 - 2. Provide protection for roots over 1-1/2 inch (38 mm) in diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt or other acceptable coating formulated to 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.
 - 3. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations in a manner acceptable to Architect. Employ a licensed arborist to repair damage to trees and shrubs.
 - 4. Replace trees that cannot be repaired and restored to full-growth status, as determined by arborist.

- D. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated or directed.

1.4 EXISTING SERVICES

- A. General: Indicated locations are approximate; determine exact locations before commencing Work.
- B. Arrange and pay for disconnecting, removing, capping, and plugging utility services. Notify affected utility companies in advance and obtain approval before starting this Work.
- C. Place markers to indicate location of disconnected services. Identify service lines and capping locations on Project Record Documents.

PART 2 – PRODUCTS

None Used.

PART 3 – EXECUTION

3.1 SITE CLEARING

- A. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site removal of stumps and roots.
 - 1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 2. Existing trees within clearing limits may be chipped and stockpiled on-site but NOT respread as landscape mulch.
- B. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.
 - 1. Completely remove stumps, roots, and other debris protruding through ground surface.
 - 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.
 - a. Place fill material in horizontal layers not exceeding 6 inches (150 mm) loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.
- C. Topsoil Stripping: Strip and stockpile existing topsoil within construction limits for re-spreading. Should the Contractor elect to remove topsoil from the site, suitable topsoil from off-site sources shall be provided for re-spreading at no cost to the Owner.
 - 1. Remove sod and grass before stripping topsoil.
 - 2. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials. All surface topsoil, regardless of thickness encountered, shall not be considered Unsuitable Soil.
 - 3. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.
 - 4. Stockpile topsoil materials within construction limits and away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 5. Do not stockpile topsoil within tree protection zones.
 - 6. Dispose of excess topsoil off-site.

- D. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.
 - 1. Abandonment or removal of certain underground pipe or conduits may be indicated on plumbing or electrical drawings and is included under work of related Division 22 and 26 Sections. Removing abandoned underground piping or conduits interfering with construction is included under this section.

3.2 DEMOLITION PREPARATION

- A. 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 or as shown on the drawings.
- B. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective site demolition area.
 - 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction or as shown on the plans.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
- C. Provide and maintain exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to be selectively demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- D. Protect trees, fences, poles, mailboxes, and all other property unless their removal is authorized. Any property damaged, that is not authorized for removal, shall be restored or replaced to the Owner's satisfaction.

3.3 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during selective site demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
 - a. Provide not less than 72 hours notice to Owner if shutdown of service is required during changeover.
- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.

- C. Utility Requirements: Coordinate with utility companies for additional requirements for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective site demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Utility Adjustments and Relocations: Adjust locations, elevations and routes of existing utility lines, poles, guys, vaults, handholes, boxes, and other related appurtenances as required to facilitate new construction. Coordinate adjustments and relocations with utility companies.

3.4 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
 - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective site demolition operations. Return adjacent areas to condition existing before start of selective demolition.

3.5 SELECTIVE SITE DEMOLITION

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated on the drawings. Use methods required to complete Work within limitations of governing regulations.
 - 1. Dispose of demolished items and materials promptly. Prolonged On-site storage or sale of removed items is prohibited.
 - 2. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Demolish asphalt, concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
- C. Remove sawcut concrete and asphalt, including aggregate base, to a depth of 12-inches below existing, adjacent grade, or as indicated. Provide neat sawcut at limits of pavement removal as indicated.

3.6 PATCHING AND REPAIRS

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective site demolition operations.
- B. Where repairs to existing surfaces are required, match previous work as closely as possible.
 - 1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.
- C. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

3.7 CLEANING

- A. Keep the site free from debris and hazards and inspect the site at the end of each day for trash. All adjacent roads and drives outside of the construction fencing shall remain in operation during construction and shall remain free of all construction materials and debris.

3.8 DISPOSAL OF WASTE MATERIALS

- A. General: Promptly and dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning on Owner's Property: Burning is not permitted on Owner's property.
- C. Removal from Owner's Property: Remove waste materials and unsuitable or excess soils and mulch from Owner's property. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing and grading subgrades.
 - 2. Excavating and backfilling for structures.
 - 3. Base course for walks and pavements.
 - 4. Subsurface drainage backfill for trenches.
 - 5. Excavating and backfilling trenches.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 01 Sections for allowances, definitions and procedures.
 - 2. Division 31 Section 311000 "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.
 - 3. Division 33 Section 3341000 "Storm Drainage Utilities" for storm drainage, foundation drainage connections outside of building and roof drainage connections outside of building.
 - 4. ~~Division 32 Section 329000 "Planting" for finish grading, including placing and preparing topsoil for permanent and temporary grass seeding.~~
 - 5. Division 31 "Soil Erosion and Sediment Control", for all areas of the site that are graded or disturbed by any construction operations

1.3 UNIT PRICES

- A. Rock Measurement: Volume of rock actually removed, measured in original position, but not to exceed the following:
 - 1. 24 inches outside of concrete forms other than at footings.
 - 2. 12 inches outside of concrete forms at footings.
 - 3. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - 4. 6 inches beneath bottom of concrete slabs on grade.
 - 5. 6 inches beneath invert elevation of pipe in trenches, and the greater of 24 inches wider than pipe diameter or 42 inches wide.
- B. Unsuitable Soil Measurement: Volume of soil actually removed, measured in original position, but not to exceed the limits directed by the Owner's Independent Testing Agency:
- C. Replacement Material Measurement: Volume exactly equal to that of the unsuitable soil or rock that was removed, measured in original position.
- D. Unit prices for unsuitable soil and rock removal shall include all work and materials as defined in Division 01 sections.

1.4 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed. Refer to the following section for additional definitions of classified excavations.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below base course, drainage fill, or topsoil materials.
- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Surface Course: The top layer of the pavement structure placed on base course or subgrade.
- E. Base Course: Layer placed between the subgrade elevation and asphalt paving courses.
- F. Bedding Course: Layer placed over excavated subgrade in a trench before laying pipe.
- G. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Architect / Engineer. Unauthorized excavation, as well as remedial work directed by the Architect / Engineer, shall be at the Contractor's expense.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.5 EXCAVATION CLASSIFICATIONS

- A. Excavation Classifications: All excavation is classified as General Excavation except for Rock and Unsuitable Soil Materials as defined in this section.
 - 1. General Excavation: Excavation, removal and/or disposal of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and/or removed; together with soil, boulders, and other materials encountered that are not classified as rock, unsuitable soil, or unauthorized excavation.
 - a. Intermittent drilling, blasting, or ripping to increase production and not necessary to permit excavation of material encountered will be considered general excavation.
 - b. Soil (irregardless of nature) or other debris encountered above proposed subgrade elevations shall be considered general excavation unless determined by the Architect / Engineer to meet the definition of rock.
 - 2. Unsuitable Soil Excavation: Removal and disposal of soil materials or other debris encountered at or below proposed subgrade elevations which is deemed unsuitable to remain in place by the Architect / Engineer or Owner's Independent Testing Agency.
 - a. Soil and/or other debris encountered above proposed subgrade elevations shall be considered general excavation.
 - b. Soil material which, in the opinion of the Architect / Engineer or Owner's independent testing agency, can be repaired by scarifying, drying and recompacting or material which is made unsuitable by delay of work, lack of protection or other actions of the Contractor or his Sub-Contractors shall not be considered as unsuitable soil and shall be repaired or replaced by the Contractor at no additional cost to the Owner.
 - c. Any material moved or removed without the measurement by the Owner's independent testing agency and approval by the Architect / Engineer will be considered as general excavation.

- d. Surface topsoil, regardless of thickness encountered, shall not be considered unsuitable soil.
 - e. Stones, rocks and boulders not meeting classifications of rock shall not be considered unsuitable soil. Stones, rocks and boulders shall be removed from soil as necessary if soil is to be used as fill or backfill. Removed stones, rocks and boulders shall be removed from the site.
3. Mass rock Excavation: Removal, in open excavations, of rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1.5-cu.yd. that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted. In the event rock (as defined above) is encountered, the Contractor shall immediately notify the Architect / Engineer.
- a. Mass Rock Excavation Equipment: Late-model, track-type CAT D-8 crawler tractor operating at one mile per hour in the lowest available gear, and at the highest normal operating rpm pulling a sharp, single-toothed ripper. The Contractor shall provide equipment specification and test data verifying that the equipment to be used for demonstration purposes complies with the minimum requirements. The equipment shall be in good repair and in proper working condition. The Owner reserves the right to inspect and approve the backhoe to be used for demonstration purposes. The Contractor shall demonstrate (at no additional cost) to the Architect / Engineer or Owner's independent testing agency that the rock cannot be practically ripped with equipment equivalent that specified above without systematic drilling and blasting. Mass rock is defined as material which, after 1 hour of continuous ripping using the equipment described above, produces less than 30 cubic yards of removeable material.
4. Trench Rock Excavation: Removal, in trench excavations, of rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1.0-cu.yd. that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted. In the event rock (as defined above) is encountered, the Contractor shall immediately notify the Architect / Engineer.
- a. Trench rock excavation equipment: Late-model, track mounted CAT 330 or equivalent hydraulic excavator equipped with a narrow bucket with new rock teeth and operating at the highest normal operating RPM. The Contractor shall provide equipment specification and test data verifying that the equipment to be used for demonstration purposes complies with the minimum requirements. The equipment shall be in good repair and in proper working condition. The Owner reserves the right to inspect and approve the backhoe to be used for demonstration purposes. Trench rock is defined as material which, after 1 hour of continuous digging using the equipment described above, removes at less 10 cubic yards material.
5. Classified excavation requirements:
- a. Excavations more than 10 feet in width and pits more than 30 feet in either length or width are defined as open excavations. Excavations less than 10 feet in width and pits less than 30 feet in both length and width are defined as trench excavations.
 - b. Contractor shall expose and clean the rock material for inspection and measurement by the Architect / Engineer.
 - c. Do not excavate rock or unsuitable soil until it has been classified and cross-sectioned by the Owner's independent testing agency or Architect / Engineer. Any material moved or removed without the measurement by the Owner's independent testing agency and approval by the Architect / Engineer will be considered as unclassified excavation.
 - d. The Architect / Engineer shall be the final judge on what is classified as unsuitable or rock excavation.

- e. The contractor may be required to provide equipment specification data verifying that the above minimum-rated equipment will be used for demonstration purposes. The equipment shall be in good repair and in proper working condition.
- f. Rippable rock, weathered rock or overburden which is not classified as rock according to the above definitions shall be considered General Excavation.

1.6 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Test Reports: In addition to test reports required under field quality control, submit the following:
 - 1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.
 - 2. One optimum moisture-maximum density curve for each soil material.
 - 3. Reports of all laboratory and field tests including evaluations of subgrades and foundation bearing conditions.
 - 4. As-built survey of athletic fields, courts and tracks demonstrating compliance with specified tolerances.
- C. Blasting plan approved by authorities having jurisdiction if applicable due to on-site rock.
- D. Report of rock or unsuitable soil removal with quantities confirmed in writing by the Architect / Engineer or Owner's independent testing agency.

1.7 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with requirements of authorities having jurisdiction. Any earthwork required for preparation of parking areas and drives shall comply with current NCDOT Standard Specifications as per the North Carolina Construction Manual.
- B. Comply with applicable requirements of NFPA 495--Explosive Materials Code.
- C. Testing and Inspection Service: Owner will employ a qualified independent geotechnical engineering testing agency to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.
 - 1. Off-site borrow material, if any, shall be tested and inspected prior to its use. All soil tests done to qualify off-site fill material for use on-site shall be paid by the Contractor as well as compaction retests required due to failure of the original tests.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01.
 - 1. Before commencing earthwork, meet with representatives of the governing authorities, Owner, Architect / Engineer, consultants, Geotechnical Engineer, independent testing agency, and other concerned entities. Review earthwork procedures and responsibilities including testing and inspection procedures and requirements. Notify participants at least 3 working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.

1.8 PROJECT CONDITIONS

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

1. Provide a minimum 48-hours' notice to the Architect / Engineer and receive written notice to proceed before interrupting any utility.
- B. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shutoff services if lines are active.

1.9 PAYMENT

- A. General Excavation: All general excavation to the lines and grades indicated on the drawings including all necessary off-site disposal of excess materials and/or off-site borrow of fill materials shall be included in the base bid.
 1. No statement is made or implied that the on-site grading and earthwork indicated on the drawings is balanced.
- B. Unsuitable Soil Material Excavation: Unsuitable soil material excavation in excess of the project allowances will be paid by unit prices included in the Contract Documents.
 1. Unused amounts of monies included under allowances shall be credited to the Owner by deduct change order.
- C. Rock Excavation: Rock excavation in excess of the project allowances will be paid by unit prices included in the Contract Documents.
 1. Unused amounts of monies included under allowances shall be credited to the Owner by deduct change order.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide approved borrow soil materials from off-site when sufficient approved soil materials are not available from excavations.
- B. Satisfactory Soil Materials: ASTM D 2487 soil classification groups GW, GC, GP, GM, ML, CL, SW, SP, SC, and SM; free of rock or gravel larger than 2 inches (50 mm) in any dimension, debris, waste, frozen materials, vegetation and other deleterious matter; with a Plasticity Index less than 20 and a Liquid Limit less than 50.
 1. Soils free of organics and having a plasticity index greater than 20 and a liquid limit greater than 50 may be used as fill in approved non-structural areas.
 2. CH and MH soils having plasticity indices great than 20 may also be used as fill in deep fill sections placed at -1% to +3% of optimum and at least 3-ft below planned subgrade elevations in pavement, building or other structural areas.
 3. Satisfactory soil materials obtained from off-site borrow sources shall meet all requirements listed above, however Plasticity Index shall be less than 20.
- C. Unsatisfactory Soil Materials: ASTM D 2487 soil classification groups MH, CH, OL, OH, and PT. Soils having a Plasticity Index greater than 20 and a Liquid Limit greater than 50 are also unsatisfactory within structural (building and pavement) areas except if placed as specified above.
- D. Excavated Rock Materials Backfill: Excavated weathered rock and blasted rock is suitable for use as fill if placed as follows under the direction and observation of the Owner's independent testing agency:
 1. Rock pieces shall not exceed 3-inches in any direction.
 2. Rock materials shall be thoroughly mixed with suitable soil prior to compaction to prevent voids.

- 3. Rock materials shall not be placed within 3-feet of the building floor slab subgrade, within 3-ft of pavement subgrade, or within the initial 2-feet of backfill of over utilities.
 - 4. In no case shall fill lifts consisting predominantly of rock be placed nor shall boulders or rock pieces be stacked on top of each other.
- E. Unsuitable Soil: Existing, in-place soil, materials or other debris encountered at or below proposed subgrade elevations deemed unsuitable by the Architect / Engineer or the Owner’s independent testing agency to remain in place and/or for use as fill or backfill material or subgrade. Soil material which, in the opinion of the Architect / Engineer or Owner’s independent testing agency, can be repaired by scarifying, drying and recompacting and/or material which is made unsuitable by delay of work, lack of protection or other actions of the Contractor or his Sub-Contractors shall not be considered as unsuitable material and shall be repaired or replaced by the Contractor at no additional cost to the Owner. Moisture content alone shall not be the determining factor as to the presence of unsuitable soil. Topsoil shall not be considered unsuitable regardless of thickness from the existing ground surface.
 - F. Backfill and Fill Materials: Satisfactory soil materials.
 - G. Base Course Material: Type A, B or C aggregate base course meeting the requirements of NCDOT “Standard Specifications for Roads and Structures.”
 - H. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
 - I. Bedding Material: #57 washed stone.
 - J. Drainage Fill: #57 washed stone.
 - K. Filtering Material/Stone: #57 washed stone.
 - L. Filter Sand: Washed, coarse to very coarse sand, 1.0 mm to 2.0 mm particles.
 - M. Impervious Fill and Clay Liner: Clayey or silty soil mixtures capable of compacting to a dense state with an maximum permeability of 0.01-in/hr compacted to at least 95% of the maximum dry density per ASTM D-698. ASTM D 2487 soil classification groups CH, CL, SC, MH, and ML; free of rock, brush, roots, and other organic material subject to decomposition.

2.2 PROCESSED AGGREGATE MATERIALS

- A. Base Course Material: Type A aggregate base course meeting the requirements of Section 520 of NCDOT “Standard Specifications for Roads and Structures.”
- B. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- C. Bedding Material: #57 washed stone.
- D. Drainage Fill: #57 washed stone.
- E. Filtering Material: #57 washed stone.
- F. Coarse Sand: Grain Size Distribution (ASTM C136-95A):

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8”	100
#4	95-100

#8	85-97
#16	60-80
#30	10-20
#50	5-15
#100	0-5

H. Bioretention Soil Mixture: Soil mix shall be uniform and free of stones, stumps, roots or other similar material greater than 2-inches. Soil mixture shall be analyzed by the NC Dept. of Agriculture. Analysis reports shall be submitted for review prior to placement of soil mixture in the bioretention cell.

1. Soil Components by dry weight.
 - a. Coarse Sand: 85% - 88%.
 - b. Silt and Clay: 8% - 12%.
 - c. Organic Matter (peat moss): 3% - 5%.
2. Phosphorous Index (P-Index): 15 minimum, 30 maximum.
3. pH Range: 5.2 – 7.0.
4. Permeability: 1-in/hr minimum, 6-in/hr maximum, 1-2-in/hr preferred.

2.3 ACCESSORIES

A. Drainage (Filter) Fabric: Nonwoven geotextile, specifically manufactured as a drainage geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 110 lbf (490 N); ASTM D 4632.
2. Tear Strength: 40 lbf (178 N); ASTM D 4533.
3. Puncture Resistance: 50 lbf (222 N); ASTM D 4833.
4. Water Flow Rate: 150 gpm per sq. ft. (100 L/s per sq. m); ASTM D 4491.
5. Apparent Opening Size: No. 50 (0.3 mm); ASTM D 4751.

B. Separation Fabric: Woven geotextile, specifically manufactured for use as a separation geotextile; made from polyolefins, polyesters, or polyamides; and with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Grab Tensile Strength: 200 lbf (890 N); ASTM D 4632.
2. Tear Strength: 75 lbf (333 N); ASTM D 4533.
3. Puncture Resistance: 90 lbf (400 N); ASTM D 4833.
4. Water Flow Rate: 4 gpm per sq. ft. (2.7 L/s per sq. m); ASTM D 4491.
5. Apparent Opening Size: No. 30 (0.6 mm); ASTM D 4751.

C. Biaxial Geogrid: Integrally formed biaxial geogrid, specifically manufactured for use as a base reinforcement for subgrade improvement. Tensar BX1100, Mirafi BXG-11, or approved equal with the following minimum properties determined according to ASTM D 4759 and referenced standard test methods:

1. Aperture Dimensions: 1-in (25-mm) nominal.
2. Minimum Rib Thickness: 0.03-in (0.76-mm) nominal.
3. Tensile Strength @ 2% Strain: 280-lb/ft (4.1 kN/m); ASTM D-6637.
4. Tensile Strength @ 5% Strain: 580-lb/ft (8.5 kN/m); ASTM D-6637.
5. Ultimate Tensile Strength: 850-lb/ft (12.4 kN/m); ASTM D-6637.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Site Maintenance: The Contractor shall be responsible to take whatever measures are necessary to insure reasonable accessibility to and on the construction site so that undue delays are avoided under normal weather conditions. These measures shall include, but not be limited to, the following:
 - 1. Maintaining the surface of the soils in a manner to promote drainage runoff and avoid ponding of water, especially prior to predicted rain events.
 - 2. Avoiding operation of temporary water sources or hoses in a manner which will cause unnecessary and repeated wetting of the site.
 - 3. Fill in severely rutted areas which are ponding water during the construction activities or after rain events with drainage fill material to assist drying and allow construction activities to continue.
 - 4. Provide drying of surface soils and soils intended for filling or backfilling as required to promote accelerated drying of those materials.
 - 5. After successful drying efforts or prior to predicted rain events, grade the areas back to a smooth condition to promote drainage runoff.
 - 6. Controlling vehicular traffic, both construction and personal on the site in a manner to prevent undue damage to soils whenever possible and practical.
 - 7. Providing temporary staging areas of crushed stone or other materials around the construction site which will better withstand the weather and traffic and keep the site accessible immediately or shortly after rain events.
 - 8. Provide de-watering equipment for any areas collecting water which may affect construction or soil densities under built areas.
 - 9. Any claims for weather related delays considered shall be considered with particular attention paid to the Contractor's efforts in regard to the above requirements

3.2 DEWATERING

- A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
 - 2. Install a dewatering system to keep subgrades dry and convey groundwater away from excavations. Maintain until dewatering is no longer required.
- C. Soft wet soils, if present at the surface, shall be dried in place by the Contractor prior to placing fill. Drying shall be accomplished by discing, plowing or other means necessary and shall be included in the Contractor's bid. Site soils are typical of the area and susceptible to loss of strength if they become wet, resulting in softening and rutting during construction. Site soils are extremely moisture sensitive, therefore, the Contractor shall take active and aggressive steps to dry soil materials wet of optimum to maintain construction progress through the work and to maintain access to and around the construction. The Contractor, at his option and cost may remove unstable, wet materials and replace with available fill materials in lieu of accomplishing soil drying procedures.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives without written permission of local authorities. Contractor shall provide all consultation, engineering, supervision, expertise, experience, and test blasting as required to protect surrounding structures and to meet the performance requirements of the local authorities.

3.4 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations. Contractor is responsible for ensuring all excavation operations and other construction comply with applicable OSHA requirements. Contractor shall provide temporary shoring and bracing as needed to construct the proposed improvements and comply with the above requirements.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
 - 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.
 - 1. Clearance: As indicated
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.
 - 1. For pipes or conduit less than 6 inches (150 mm) in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
 - 2. For pipes and conduit 6 inches (150 mm) or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
 - 3. Where encountering rock or another unyielding bearing surface, carry trench excavation 6 inches (150 mm) below invert elevation to receive bedding course.

3.8 APPROVAL OF SUBGRADE PRIOR TO PLACING FILL OR OTHER IMPROVEMENTS

- A. Notify Architect / Engineer when excavations have reached required subgrade.
- B. After stripping is complete the exposed subgrade shall be proofrolled with a fully loaded dual wheel tandem axial dump truck or similar construction equipment. Four passes shall be made in each orthogonal direction. The proofrolling operation shall be observed by the Architect / Engineer. Should

any area fail to tighten up after proofrolling and continue to rut and/or pump, the soil shall be scarified and moistened or aerated and recompacted. Repeat proofrolling operations.

- C. When Architect / Engineer or Owner's independent testing agency determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 - 1. Unforeseen additional excavation and replacement with suitable material approved by the Architect / Engineer will be considered unsuitable material and will be paid by unit prices included in the Contract Documents. Refer to Division 01 Sections.
- D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect / Engineer. Install french drains at design subgrade if directed by the Owner's independent testing agency and approved by the Architect / Engineer.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Architect / Engineer.
 - 1. Fill unauthorized excavations under other construction as directed by the Architect / Engineer or the Owner's independent testing agency.
- B. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Architect / Engineer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
 - 8. Removal of objectionable materials, including rocks larger than acceptable size, from backfill soils.

3.12 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

- B. Pipe sleeves and concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches (450 mm) of footings. Place concrete to level of bottom of footings. Contact the Architect / Engineer or the Owner's independent testing agency to coordinate details, procedures and possible alternatives.
- C. ~~Provide 4 inch (100 mm) thick concrete base slab support for piping or conduit less than 30 inches (750 mm) below surface of roadways. After installation and testing, completely encase piping or conduit in a minimum of 4 inches (100 mm) of concrete before backfilling or placing roadway base course.~~
- D. Place and compact initial backfill of satisfactory soil material or base course material, free of particles larger than 1 inch (25 mm), to a height of 12 inches (300 mm) over the utility pipe or conduit.
 - 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- E. Coordinate backfilling with utilities testing.
- F. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- G. Place and compact final backfill of satisfactory soil material to final subgrade.
- H. Install detectable warning tape and copper wire directly above utilities, 12 inches (300 mm) below finished grade, except 6 inches (150 mm) below subgrade under pavements and slabs.

3.13 FILL

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
 - 1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.
- B. Obtain approval of subgrade as specified prior to placing fill.
- C. Place fill material in layers to required subgrade elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.
 - 2. Under walks, pavements, buildings and other structural areas use base course material, or satisfactory excavated or borrow soil material.
 - 3. ~~Pond embankments, use impervious fill.~~
- D. Following placement of fill the subgrade of building and pavement areas shall be proofrolled as described in the Field Quality Control section. The proofrolling operation shall be observed by the Owner's testing agency. Should any area fail to tighten up after proofrolling and continue to rut and/or pump, the soil shall be scarified and moistened or aerated and recompacted. Repeat proofrolling operations.
- F. Deep Fill Settlement: Areas of the site to receive more than 8 feet of fill shall be filled to subgrade elevations and allowed to settle for a period of 60-days prior to additional construction on the fill. Deep fill settlement hubs may be installed and monitored in-lieu of the 60-day waiting period.
- G. Deep Fill Settlement Hubs: Install at least 2 settlement hubs (18-in long rebar or similar) at the surface of fill in the building area where fill depths exceed 8 feet. Record daily elevation measurements of hubs and provide data to the Architect / Engineer and the Owner's independent testing agency. Do not begin building construction until the Owner's independent testing agency has confirmed that any fill-induced settlement has subsided and approval to proceed is granted by the Architect / Engineer.

- H. Overbuild Deep Fill Slopes: Overbuild fill slopes in building or pavement areas that are taller than 6 feet and cut back to firm material following compaction. Fill slopes taller than 6 feet shall be overbuilt a sufficient distance to achieve required compaction at the design slope surface.

3.14 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 3 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.
 - a. Stockpile or spread and dry removed wet satisfactory soil material.

3.15 COMPACTION

- A. Place backfill and fill materials in layers not more than 6-8 inches (200 mm) in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches (100 mm) in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D698 Standard Proctor:
 - 1. Under structures, steps, walks, courts, tracts, and pavements, compact the top 24 inches below subgrade at 98% and each layer of backfill or fill material at 95% of the standard Proctor Density (ASTM D-698). Moisture content of the fill during placement shall be kept within 3% from the optimum moisture.
 - a. Under pavements within NCDOT rights-of-way or new pavement to be constructed to NCDOT standards compact the top 8 inches below pavement subgrade to at least 100% density in accordance with AASHTO T-99 as modified by NCDOT.
 - 2. Under lawn or unpaved areas, compact the top 6 inches below subgrade and each layer of backfill or fill material at 90 percent maximum dry density.
 - 3. In pond embankments, compact each layer of backfill or fill material at 95% of the standard Proctor Density (ASTM D-698). Moisture content of the fill during placement shall be kept within 3% of optimum.
 - 4. Compact each layer of aggregate base material under pavement to 100% density in accordance with AASHTO T-180 as modified by NCDOT.
 - 5. Avoid compaction of Bio-retention soil mixture. Place soil mixture in deep, uncompacted lifts and sequence backfill to keep heavy equipment (larger than a Bobcat) off backfilled soil.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between existing adjacent grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1.2 inches (0.10 foot).
 - 2. Walks: Plus or minus 1.2 inches (0.10 foot).
 - 3. Pavements: Plus or minus 1/2 inch (0.05 foot).
 - 4. Athletic Fields:
 - a. Subgrade: Plus or minus 1.2 inches (0.10 foot).
 - b. Final Grade (Topsoil): Plus or minus 1/2 inch (0.05 foot) when tested with a 10 foot straightedge. Surfaces shall be top dressed following establishment of grass as necessary to obtain smooth, consistent playing surface.
 - 5. Pond Embankments: Construct embankment to an elevation 10% higher than the design height to allow for settling.

3.17 SUBSURFACE / FOUNDATION DRAINAGE

- A. Drainage Piping: Drainage pipe is specified in Division 33 Section "Storm Utility Drainage Piping."
- B. Subsurface and Foundation Drains: Place a layer of drainage fabric around perimeter of drainage trench. Place a course of drainage fill material on drainage fabric to support drainage pipe. Encase drainage pipe in drainage fill material and wrap in drainage fabric, overlapping sides and ends at least 6 inches.
 - 1. Compact each course of drainage fill material.
 - 2. Place satisfactory excavated or borrow soil material or topsoil fill material (as appropriate) over drain to final grade.

3.18 BASE COURSES

- A. Under pavements, walks, courts and tracks, place base course material on prepared subgrades.
 - 1. Compact base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 100 percent density in accordance with AASHTO T-180 as modified by NCDOT.
 - 2. Shape base course to required crown elevations and cross-slope grades.
 - 3. When thickness of compacted base course is 6 inches or less, place materials in a single layer.
 - 4. When thickness of compacted base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick when compacted.
 - 5. Following compaction testing and within 48 hours prior to the application of asphalt or concrete pavement, the aggregate base course shall be proofrolled with a fully loaded dual wheel tandem axial dump truck or similar construction equipment. Four passes shall be made in each orthogonal direction. The proofrolling operation shall be observed by the Architect / Engineer. Should any area fail to tighten up after proofrolling and continue to rut and/or pump, the base course shall be scarified and moistened or aerated and recompacted. Repeat proofroll testing.
- B. Pavement Shoulders: Place shoulders along edges of base course to prevent lateral movement. Construct shoulders at least 12 inches (300 mm) wide of acceptable soil materials and compact simultaneously with each base course layer.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
 - 1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), or equal.
 - 2. Paved Areas (including courts and tracts): At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 5000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests. Observe proofrolling of finished subgrade and aggregate base course.
 - 3. Trench Backfill (Drainage): Perform at least one field in-place density test per 2 feet of backfill per 200 linear feet or less of trench, but no fewer than one test per trench per day.
 - 4. Pond Embankments: ~~At subgrade and at each compacted fill and backfill layer, perform at least one field in place density test for every 200 linear ft. or less of embankment, but in no case fewer than ten tests. Monitor use of impervious fill as embankment materials.~~
 - 5. Non-Structural Areas: Field density and moisture content tests shall be performed on the fill and backfill at a rate of one test per every 10,000 square yards of fill per lift, per day
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.
- C. Proofrolling: Subgrade to receive fill, finish subgrade of building or pavement areas, and aggregate base courses shall be proofrolled with a fully loaded dual wheel tandem axial dump truck or similar construction equipment. Four passes shall be made in each orthogonal direction. The proofrolling operation shall be observed by the Owner's testing agency. Should any area fail to tighten up after proofrolling and continue to rut and/or pump, the soil shall be scarified and moistened or aerated and recompact. Repeat proofrolling operations.
- D. Perform evaluation of soils to be used as embankment fill.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace material to depth directed by the Architect / Engineer; reshape and recompact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus soil and waste material, including unsatisfactory soil, excess topsoil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 31 20 00

SECTION 31 25 00 - EROSION CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following: Soil erosion and sedimentation control for all areas of the site that are graded or disturbed by any construction operations and elsewhere as indicated on the Drawings or specified herein. Erosion control shall be as specified herein and as may be required by actual conditions and governing authorities.
- B. The Contractor is fully responsible for all applicable permits and approvals for off-site borrow and waste areas.
- C. The Contractor shall have full responsibility for the construction and maintenance of erosion control and sedimentation control facilities as shown on the Drawings and as specified herein. The Contractor shall at all times provide the operation and maintenance necessary to operate the permitted sediment and erosion controls at optimum efficiency.
- D. The Contractor shall provide permanent or temporary ground cover as soon as possible over disturbed areas of the site, and shall provide permanent or temporary ground cover in no more than 30 days after construction activities have permanently or temporarily ceased over the disturbed area. Temporary or permanent ground cover shall be provided on slopes within 15 days after construction activities have permanently or temporarily ceased.
- E. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 31 Section "Site Clearing."
 - 2. Division 31 Section "Earth Moving."
 - 3. ~~Division 32 Section "Planting."~~

1.3 PRODUCT HANDLING

- A. Deliver seed, fertilizer and other packaged materials in unopened original packages with labels legible and intact. Seed packages shall bear a guaranteed analysis by a recognized authority.
- B. On-site storage of materials shall be kept to a minimum. Wet or damaged seed or other material shall be removed from the project site immediately.

1.4 MONITORING AND RECORD KEEPING

- A. Contractor shall abide by all conditions of the General Permit to Discharge Stormwater under the National Pollutant Discharge Elimination System (NPDES), Permit No. NCG010000 (obtain copy from Owner) and the general requirements listed below. NPDES General Permit No. NCG010000 can be viewed at:
<https://ncdenr.s3.amazonaws.com/s3fs-public/Water%20Quality/Surface%20Water%20Protection/SPU/SPU%20-%20NPDES%20Permit%20Forms%20and%20Documents/GPNCG01-20110803-DWQ-SPU.pdf>

- B. All sediment and erosion control devices and facilities shall be inspected at least once every seven (7) calendar days and within 24 hours after any storm event of greater than 0.5 inches of rain per 24 hour period.
- C. Stormwater discharges shall be inspected by observation for stormwater discharge characteristics (as listed below) at the above frequency to evaluate the effectiveness of the sediment control facilities, devices or practices. Observations shall be made at all stormwater discharge outfalls and other locations where concentrated stormwater discharges from the site. Observations shall be qualitative, no analytical testing or sampling is required. If any visible off-site sedimentation is leaving the site, corrective action shall be taken to reduce the discharge of sediments.
 - 1. Color.
 - 2. Odor.
 - 3. Clarity.
 - 4. Floating solids.
 - 5. Suspended solids.
 - 6. Foam.
 - 7. Oil sheen.
 - 8. Other obvious indicators of stormwater pollution.
- D. The contractor shall perform and keep records of the above inspections. Visible sedimentation found off the site shall be recorded with a brief explanation as the measures taken to prevent future releases as well as any measures taken to clean up the sediment that has left the site. This record shall be made available to the Owner, Architect and governmental authorities.

PART 2 - PRODUCTS

~~2.1 SOIL AMENDMENTS AND SEED~~

~~A. Refer to Division 32 Section "Planting."~~

2.2 MISCELLANEOUS

- A. Gravel for Stone Filters: Washed No. 57 stone or as indicated on the drawings.
- B. Silt Fabric: A synthetic filter fabric or a pervious sheet of polypropylene, nylon, polyester, or polyethylene yarn, which is certified by the manufacturer or supplier as conforming to the following requirements.
 - 1. Filtering efficiency: 85% min.
 - 2. Tensile Strength at 20% (max) elongation: 30 lb/lin in (min).
 - 3. Slurry Flow Rate: 0.3 gal/sq-ft/min (min)
 - 4. Fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected useable construction life.
- C. Filter Fabric (for installation under riprap): Woven geotextile fabric, apparent opening size no larger than US Standard Sieve no. 70, min. grab strength of 120-lbs.
- D. Temporary Inlet Sediment Control Device: Storm drainage inlet sediment control device shall be a secured weather resistant, permeable covering that fully encompasses the inlet slots of the drain until the surrounding drainage area has been stabilized. The covering shall be a weather resistant type of adequate width to prohibit inflow until the surrounding parking area and driveway are paved. Remove shortly thereafter.
- E. ~~Polyacrylamide (PAM) Turbidity Control Log: Soil specific tailored, solid form PAM product containing blends of water treatment components and polyacrylamide co-polymer for water clarification (25 NTU max.~~

~~at outlet of sediment basin) and erosion control. Product shall be designed for site specific soil and water conditions. APS 700 Series Floe Log by Applied Polymer Systems, Inc. or approved equal.~~

- F. Dewatering Silt Bag: Permeable, non-woven geotextile bag manufactured to accept and filter pumped, sediment-laden water from dewatering activities. Silt bag shall be sized as appropriate for the dewatering pump discharge rate and shall be fitted with a fill spout large enough to accommodate the discharge piping of the dewatering pump. General style, type, quality and character are; Dirtbag as manufactured by ACF Environmental, Inc., US Filter Bags as manufactured by US Fabrics, Inc., Dandy Dewatering Bag as manufactured by Dandy Products, Inc. or approved equal.
- G. ~~Compost Filter Sock: Three dimensional tubular sediment control device comprised of an organic compost filter media contained in a tubular knitted mesh sock.~~
- ~~1. Filter media shall be mature compost that has been certified by the US Composting Council's Seal of Testing Assurance Program and meeting the following specifications:
 - a. pH: 5.0 — 8.5.
 - b. Moisture Content: < 60%.
 - c. Organic Matter: >25%, dry weight.
 - d. Particle Size: 99% passing 2 in sieve, 30-50% passing 3/8 in sieve.~~
 - ~~2. Filter sock netting shall be 5 mm thick continuous HDPE filament, tubular knitted mesh with 3/8 in openings. Filled sock shall be a minimum of 12 in in diameter.~~
 - ~~3. Stakes shall be 2x2 in x 3 ft wooden stakes.~~

2.3 CHANNEL AND SLOPE MATTING

- A. Slope and Channel Matting: Erosion Control blankets shall be a machine-produced mat of curled wood fiber (excelsior) or synthetic polypropylene fiber as specified below. The blanket shall be of consistent thickness with the fiber evenly distributed over the entire area of the mat. The blanket shall be covered with a photo degradable plastic netting secured to the fiber mat. Slope matting and channel liners shall be excelsior mat unless otherwise indicated on the drawings.
1. Excelsior Mat (Turf Reinforcement Mat):
 - a. Fiber: Curled wood excelsior of 80% six inch or longer fiber length with a consistent width of fibers evenly distributed throughout the mat. Mat shall be smolder resistant with no chemical additives.
 - b. Top and Bottom Netting: Photo degradable extruded plastic netting with maximum mesh size of 3/4" x 3/4".
 2. Coconut Mat (Turf Reinforcement Mat):
 - a. Fiber: 100% coconut fiber (0.5-lbs./sq.yd.)
 - b. Top Netting: 100% biodegradable jute (9.3-lbs/1000-sq.ft. approx. weight.)
 - c. Bottom Netting: 100% biodegradable jute (7.7-lbs/1000-sq.ft. approx. weight.)
 - d. General style, type, quality and character are; C125BN by North American Green, ECC-2B by East Coast Erosion Blankets, C4000BD by Enviroscope ECM,Ltd. or approved equal.
 3. Synthetic Mat:
 - a. Fiber: UV stabilized polypropylene fiber matrix (0.7-lbs./sq.yd.)
 - b. Top Netting: Extra heavyweight UV stabilized polypropylene (5-lbs/1000-sq.ft. approx. weight.)
 - c. Bottom Netting: Heavyweight UV stabilized polypropylene (3-lbs/1000-sq.ft. approx. weight.)

- d. General style, type, quality and character are; P300 by North American Green, ECP-3 by East Coast Erosion Blankets, PP5-10 by ADS Geosynthetics or approved equal.
4. Wire Staples: 16 gauge steel wire, with minimum of 3" top and 6" long legs. 1.75 staples per square yard of matting minimum.

2.4 RIPRAP

- A. Riprap: Provide riprap of the class and quantity indicated on the Drawings. While no specific gradation is required, the various sizes of the stone shall be equally distributed within the required size range. The size of an individual stone shall be determined by measuring its long dimension. Stone shall meet the requirements of the following table for class and size distribution. No more than 5% of the material furnished can be less than the minimum size specified nor no more than 10% of the material can exceed the maximum size specified.

REQUIRED STONE SIZES - INCHES			
CLASS	MINIMUM	MIDRANGE	MAXIMUM
A	2	4	6
B	5	8	12
1	5	10	17
2	9	14	23

PART 3 - EXECUTION

3.1 GENERAL

A. Existing Structures and Facilities

- 1. Existing structures, facilities, and water courses shall be protected from sedimentation.
- 2. The Contractor shall be responsible for the construction of necessary measures, and all costs shall be at the expense of the Contractor.
- 3. Items to be protected from sedimentation deposits shall include, but are not limited to, all down stream property, natural waterways, streams, lakes and ponds, catch basins, drainage ditches, road gutters, and natural buffer zones.
- 4. Control measures such as the erection of silt fences, barriers, dams, or other structures shall begin prior to any land disturbing activity. Additional measures shall be constructed as required during the construction.
- 5. All facilities installed shall be maintained continuously during construction until the disturbed areas are stabilized. Contractor shall remove all erosion control measures at the end of the project at his expense unless otherwise directed by the Owner or his representative.
- 6. Perform monitoring and record keeping as specified in this section.

3.2 PROTECTIVE MEASURES

A. Protective measures shall conform to all State and Local requirements.

B. Construction and maintenance of sediment and erosion control measures shall be in accordance with all applicable laws, codes, ordinances, rules and regulations.

- 1. Silt Fence: Hog wire or wire mesh fastened to posts as recommended by the Manufacturer, and covered with silt fabric.
- 2. Berms and Diversion Ditches: These shall be graded channels with a supporting ridge on the lower side constructed across a sloping land surface. Diversion ditches and berms shall be planted in vegetative cover as soon as completed.

3. Mulching: Mulching shall be used to prevent erosion and to hold soil and seed in place during the establishment of vegetation.
4. Matting: Temporary slope and channel matting shall be used for temporary stabilization during the establishment of seeded cover in all grassed ditches, channels, long slopes, and steep banks (6:1 or steeper) and additional areas as indicated on plans. Matting shall be installed on any area on site as needed to provide temporary stabilization whether or not matting is indicated on the plan. Install as indicated or per manufacturer's instructions. The installation of matting may be waived by the Architect if surface stabilization is obtained by other methods within the appropriate and agreed time frames. If adequate stabilization is not obtained, the Contractor shall install matting where required at no additional cost to the Owner. Allowances in the contract for Turf-Reinforcement Mat shall be considered to be in addition to the matting indicated on the plan and required by this Section.
5. Build Berm, Pits and Gravel Filter as shown on Drawings. Maintain during construction to keep erosion and sedimentation to a minimum. When it is necessary to remove berm, pits, and gravel, return area to required profiles and condition.
6. Construction Entrances: Construct all entrances in accordance with plans. Maintain all ingress/egress points to prevent tracking of soil onto the Owner's, public or private roads. Any soil that is tracked onto the roads shall be removed immediately.
7. Riprap: Stone shall be graded so that the smaller stones are uniformly distributed throughout the mass. Stone may be placed by mechanical methods, augmented by hand placing where necessary, provided that when the riprap is completed it forms a properly graded, dense, neat layer of stone.
8. Other Measures: Other methods of protecting existing structures and facilities, such as vegetative filter strips, diversions, rip-rap, baffle boards, and ditch checks used for reduction of sediment movement and erosion, may be used at the option of the Contractor when approved by the appropriate State or local authorities.
9. Manufactured Inlet Sediment Control Device: Install device in accordance with manufacturer's instructions and install a curb deflector if appropriate. Inspect device after each rain event and at intervals not exceeding two weeks during construction. Remove, empty, clean, and replace the device as needed during construction. Empty collected sediment in approved, protected location. Remove and dispose of device following full and permanent stabilization of the contributing drainage area.
10. ~~PAM Turbidity Logs: At a minimum, install logs in drainage structures located immediately upstream of sediment basins and traps. Install additional logs in any other locations indicated on the drawings. Install per manufacturer's instructions. Check logs regularly and after every runoff producing rainfall and replace as needed throughout the duration of construction.~~
11. Dewatering Silt Bag: Install silt bag on an undisturbed slope so incoming water flows downhill through the bag without causing erosion. Remove and replace silt bag when device no longer drains efficiently due to accumulated sediment in bag. Empty bag within disturbed limits of the site protected by other sediment control measures.
12. ~~Compost Filter Socks: Stake filter sock every 10 ft. Drive stakes through the center of the sock and 1 ft into the ground. If sock netting must be joined, fit beginning of the new sock over the end of the old sock, overlapping by 1-2 ft. Fill with compost and stake the joint.~~

C. Provide the following, at a minimum, to prevent windblown dust.

1. Apply straw mulch and establish temporary or permanent ground cover on exposed soil where work is not being actively performed.
2. Cover or establish vegetative cover on stockpiles.
3. Apply water or other approved dust suppressant as needed to soil surfaces before they become excessively dry.
4. Sweep and collect soil that has been tracked onto paved surfaces.

3.3 STABILIZATION

A. Permanently protect stabilized areas prior to the removal of protective devices.

- B. After the final establishment of permanent stabilization, remove temporary sediment control measures. Re-spread accumulated sediments as specified.
- C. Permanently stabilize all areas disturbed by the removal and re-spreading operations immediately.

3.4 TEMPORARY SEEDING

- A. In accordance with the schedule as detailed on the drawings.

3.5 PERMANENT SEEDING

- A. In accordance with the schedule as detailed on the drawings.

3.6 MULCHING AND MATTING

- A. Apply mulch or matting to retain soil and grass.
- B. Mulch areas with slope greater than 5% by spreading a light cover of mulch over seeded area at the rate of not less than 95 lbs. per 1000 sq. ft.
- C. Install temporary matting in all grassed ditches, channels, long slopes, and steep banks (6:1 or steeper) and additional areas indicated on plans or where extra protection from erosion is needed.

3.7 TACKIFIER

- A. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- B. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors. (9 gals/1,000 SF).

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes provisions for hot-mixed asphalt paving over prepared subbase.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements of NCDOT "Standard Specifications for Roads and Structures".
- C. Job Mix Formula: Provide Geotechnical consultant with two copies of the proposed job mix formula at least ten days prior to beginning work. This formula shall be approved by NCDOT for the type of pavement specified.
- D. Recycled Content: 15% minimum, or as approved by NCDOT.

1.4 SITE CONDITIONS

- A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg F and when temperature has not been below 35 deg F for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct hot-mixed asphalt surface course when atmospheric temperature is above 50 deg F and when base is dry. Base course may be placed when air temperature is above 30 deg F and rising.
- C. Grade Control: Establish and maintain required lines and elevations.
- D. Traffic Control: Provide traffic control devices, lane closures, positive protection and/or any other warning or positive protection devices necessary for the safety of road users and pedestrians during construction.
 - 1. Traffic control shall be performed in conformance with the latest NCDOT Roadway Standard Drawings and Standard Specifications for Roads and Structures and the Manual on Uniform Traffic Control Devices for Streets and Highways.
 - 2. Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with ADA guidelines.
 - 3. Two-way traffic shall be maintained at all times through use of flagmen when necessary.
 - 4. Maintain access for fire-fighting equipment and access to fire hydrants.

1.5 QUALITY ASSURANCE

- A. All materials, construction methods and testing shall comply with the requirements of the latest editions of the North Carolina Department of Transportation (NCDOT) “Standard Specifications for Roads and Structures” and the Asphalt Handbook Manual Series No. 4 (MS-4).
- B. All work within any NCDOT right-of-way shall conform to the provisions and conditions of the NCDOT encroachment agreement(s) and driveway permit(s) and other applicable NCDOT standards and policies. The encroachment agreement(s) and driveway permit(s) are considered part of the project specifications by reference. Copies of the agreement(s) and permit(s) will be provided upon request from the Architect / Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Use locally available materials and gradations that comply with the requirements of the NCDOT "Standard Specifications for Roads and Structures" and exhibit a satisfactory record of previous installations. All asphalt mixes shall include at least 20% recycled asphalt product.
- B. Aggregate Base Course (ABC): Type A, B or C aggregate base course meeting the requirements of the latest version of NCDOT "Standard Specifications for Roads and Structures.”
- C. Superpave Asphalt Paving Mix: Superpave base, intermediate and surface asphalt paving mix meeting the requirements of the latest version of NCDOT “Standard Specifications for Roads and Structures.” Types as indicated on the drawings.
- D. Tack Coat: Asphalt material meeting the requirement of the latest version of NCDOT "Standard Specifications for Roads and Structures.”
- G. Parking Lot Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.
 - 1. Color: White for parking and bus lot striping.
 - 2. Color: Yellow for fire lanes and service area striping.
- I. Roadway Pavement Marking Paint: Thermoplastic Alkyd/Maleic and Hydrocarbon type, meeting the requirements of Section 1087 of NCDOT "Standard Specifications for Roads and Structures.”
 - 1. Color: As indicated on the drawings.
- J. Seal Coat Surface Treatment: Mixture of a mineral-colloid-stabilized emulsified refined tar pavement sealer, sand, water, and latex polymer modifier specifically formulated to protect and seal porous asphalt surface pavements. Mixture shall be blended as recommended by the sealer manufacturer.
 - 1. Emulsified Refined Tar Pavement Sealer: ASTM D 5727, ASTM D-490, grade RT-12 derived from high temperature coke oven tar. Oil and water gas tars shall not be used. The emulsion shall be produced using a colloid mill.
 - 2. Sand: Washed and graded silica sand, or crushed, washed, and graded slag, free of all contaminates, and conforming to the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
#8	100
#16	95-100
#30	63-93
#50	10-40
#100	0-10

3. Latex Polymer: As specified by the Sealer manufacturer.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. General: Remove loose material from compacted subbase surface immediately before applying base courses or asphalt.
- B. Proof-roll prepared subgrade surface as described in Division 31 Section "Earth Moving" to check for unstable areas and areas requiring additional compaction.
- C. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving. Ensure subgrade is graded for proper drainage. Repair as needed to avoid ponding on final pavement surfaces.
- D. Place aggregate base courses as specified in Section 31 20 00 "Earth Moving".
- E. Cold mill surfaces of existing pavements in locations and to depths as indicated on the drawings and as follows.
 1. Cold mill surfaces of existing pavements to a minimum depth of 1.5-inches at longitudinal terminus of asphalt overlays for a minimum width of 10 feet (extend terminus milling width to 100-ft on public roads) and at horizontal terminus (including along gutter line of existing curbs adjacent to asphalt overlays) for a minimum width of 6 feet to allow a smooth transition from full-depth thickness of overlay course to existing pavement or gutter surface. Thoroughly remove all loose material from milled surface before placing tack coat.
 - 2.. Cold mill surfaces of existing pavements to required depths at edges of asphalt wedge sections on public roads for widths needed to allow minimum depth thickness of wedge course. Thoroughly remove all loose material from milled surface before placing tack coat.
- F. Thoroughly remove all dust and loose material from surfaces of that which the tack coat is to be applied along with adjacent surfaces before placing tack coat.
- G. Apply tack coat to all contact surfaces of milled asphalt, existing asphalt to be overlaid, and surfaces abutting or projecting into hot-mixed asphalt pavement including the vertical face of adjacent concrete gutter. Distribute evenly and thoroughly at a rate of 0.04 to 0.08 gallons per sq. yd. of surface. Do not place any asphalt mixture until the tack coat has sufficiently cured.
- H. Allow to dry until at proper condition to receive paving.
- I. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.2 PLACING MIX

- A. Limitations: Do not produce or place asphalt mixtures during rainy weather, when the subgrade or base course is frozen, or when the moisture on the surface to be paved would prevent proper bond. Comply with all NCDOT weather and temperature limitations.
- B. General: Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 225 deg F. Place areas inaccessible to equipment by hand. Place each course to required grade, cross-section, and compacted thickness.

- C. Paver Placing: Place in strips not less than 10 feet wide, unless otherwise acceptable to Architect / Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.
- D. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.
- E. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.
- F. Apply tack coat to all contact surfaces of previous asphalt lifts and surfaces abutting or projecting into hot-mixed asphalt pavement including the vertical face of adjacent concrete gutter. Distribute evenly and thoroughly at a rate of 0.04 to 0.08 gallons per sq. yd. of surface.
 - 1. Apply only as much tack coat as can be covered during the same day's operation.
 - 2. Take necessary precautions to limit the tracking and/or accumulation of tack coat material on either existing or newly constructed pavements. Excessive accumulation of tack may require corrective measures.
 - 3. Apply tack coat material with a distributor spray bar that can be adjusted to uniformly coat the entire surface at the directed rate. Use hand hose attachments only on irregular area and areas inaccessible to the spray bar. Cover these areas uniformly and completely.
 - 4. Apply tack coat to contact surfaces of gutters, concrete pavements, manholes, vertical faces of old pavements, and all exposed transverse and longitudinal edges of each course before mixture is placed adjacent to such surfaces.
 - 5. Cover curbs, adjacent concrete, and all other appurtenances to protect them from tracking or splattering tack coat material.
 - 6. Do not place any asphalt mixture until the tack coat has sufficiently cured.

3.3 ROLLING

- A. General: Begin rolling when mixture will bear roller weight without excessive displacement.
- B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.
- D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.
- E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained required density. Compact the asphalt to at least the minimum percentage of the maximum specific gravity listed below unless otherwise allowed by NCDOT.
 - 1. SF-9.5A: 90.0% of Maximum Specific Gravity
 - 2. S-9.5B, I-19.0B, B-25.0B: 92.0% of Maximum Specific Gravity.
- F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot hot-mixed asphalt. Compact by rolling to specified surface density and 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.

3.4 SEALCOATING OF EXISTING ASPHALT PAVEMENT

- A. Preparation: Existing pavement surfaces shall be cleaned of all dust, dirt and any loose materials. Treat oil and grease spots as recommended by sealant manufacturer. Allow newly paved asphalt surfaces to cure a minimum of 30-days prior to application. Blacken existing traffic control markings with black epoxy or black acrylic coating.
- B. Apply sealant only when the surface to be treated is dry and when the atmospheric temperature is within acceptable range specified by the sealant manufacturer. Do not apply asphalt material in fog or rain weather conditions.
- C. Prepare mix per manufacturer's instructions for "moderate traffic" and skid resistance.
- D. Apply mixture in at least two (2) coats per manufacturer's written instructions. Allow previous coat to completely dry prior to application of subsequent coats.
- E. Erect barricades as necessary to protect surface until completely cured.

3.5 TRAFFIC MARKINGS

- A. Cleaning: Sweep and clean surface to eliminate loose material and dust.
- B. Materials: Use thermoplastic marking for permanent markings on public streets and stop bars and crosswalks on private drives and parking lots. Use marking paint for parking stall and fire lane striping and other markings on private drives and parking lots.
- C. Apply traffic paint with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates to provide minimum 12 to 15 mils dry thickness.

3.6 FIELD QUALITY CONTROL

- A. General: Testing of asphalt concrete mix and in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory in accordance with Division 01 Section "Quality Control." Repair or remove and replace unacceptable paving as directed by Architect / Engineer.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from the specified requirements.
- B. Thickness: In-place compacted thickness shall be tested in accordance with ASTM D 3549. Results shall be considered unacceptable if less than the thickness specified on the drawings.
- C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10 feet straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:
 - 1. Base Course Surface: 1/4 inch.
 - 2. Wearing Course Surface: 3/16 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.
- D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.
1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
 2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.
 - a. One core sample will be taken for every 2000 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.
 - b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.
- E. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
- F. Contractor shall repair all test core holes with full depth asphalt patch.
- G. Perform ponding water tests. Repair areas of pavement that pond water.
- H. Check surface areas at intervals as directed by Architect / Engineer.

END OF SECTION

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes exterior portland cement concrete paving for the following:
 - 1. Curbs and gutters, pavement, walkways, service court, dumpster pads.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 31 Section "Earth Moving" for subgrade preparation, grading and subbase course.
 - 2. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
 - 3. ~~Division 07 Section "Sealants and Caulking" for joint fillers and sealants within concrete paving and at joints with adjacent construction.~~

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Architect.
- C. Design mixes for each class of concrete. Include percentage of recycled content (20% minimum). Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 QUALITY ASSURANCE

- A. Concrete Standards: Comply with provisions of the following standards, except where more stringent requirements are indicated.
 - 1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."
- B. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- C. Concrete Testing Service: Engage a qualified independent testing agency to perform materials evaluation tests and to design concrete mixes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves with a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
- D. Plain Steel Wire: ASTM A 82, as drawn.
- E. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- F. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- G. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use one of the following cementitious materials, of the same type, brand, and source throughout the Project:
 - 1. Portland Cement: ASTM C 150, portland cement, Type I, II, or III.
 - a. Fly Ash: ASTM C 618, Class F. 20% by weight of required cement content, with 1.2-lbs Fly Ash per 1-lb of cement replaced.
 - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120 with 1-lb slag per 1-lb of cement replaced.

- B. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate, uniformly graded. Provide aggregates from a single source[with documented service record data of at least 10 years' satisfactory service in similar pavement applications and service conditions using similar aggregates and cementitious materials].
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C 94/C 94M, potable.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.5 FIBER REINFORCEMENT

- A. Synthetic Fiber: Monofilament or fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
 - 1. Available Products:
 - a. Monofilament Fibers:
 - 1) Axim Concrete Technologies; Fibrasol IIP.
 - 2) Euclid Chemical Company (The); Fiberstrand 100.
 - 3) FORTA Corporation; Forta Mono.
 - 4) Grace, W. R. & Co.--Conn.; Grace MicroFiber.
 - 5) Metalcrete Industries; Polystrand 1000.
 - 6) SI Concrete Systems; Fibermix Stealth.
 - b. Fibrillated Fibers:
 - 1) Axim Concrete Technologies; Fibrasol F.
 - 2) FORTA Corporation; Forta.
 - 3) Euclid Chemical Company (The); Fiberstrand F.
 - 4) Grace, W. R. & Co.--Conn.; Grace Fibers.
 - 5) SI Concrete Systems; Fibermesh.

2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
 - 1. Available Products:
 - a. Axim Concrete Technologies; Cimfilm.
 - b. Burke by Edeco; BurkeFilm.
 - c. ChemMasters; Spray-Film.
 - d. Conspec Marketing & Manufacturing Co., Inc.; Aquafilm.
 - e. Dayton Superior Corporation; Sure Film.
 - f. Euclid Chemical Company (The); Eucobar.
 - g. Kaufman Products, Inc.; Vapor Aid.
 - h. Lambert Corporation; Lambco Skin.
 - i. L&M Construction Chemicals, Inc.; E-Con.
 - j. MBT Protection and Repair, ChemRex Inc.; Confilm.
 - k. Meadows, W. R., Inc.; Sealtight Evapre.
 - l. Metalcrete Industries; Waterhold.
 - m. Nox-Crete Products Group, Kinsman Corporation; Monofilm.
 - n. Sika Corporation, Inc.; SikaFilm.
 - o. Symons Corporation; Finishing Aid.
 - p. Vexcon Chemicals, Inc.; Certi-Vex EnvioAssist.
- E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
 - 1. Available Products:
 - a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
 - b. Burke by Edoko; Aqua Resin Cure.
 - c. ChemMasters; Safe-Cure Clear.
 - d. Conspec Marketing & Manufacturing Co., Inc.; W.B. Resin Cure.
 - e. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
 - f. Euclid Chemical Company (The); Kurez DR VOX.
 - g. Kaufman Products, Inc.; Thinfilm 420.
 - h. Lambert Corporation; Aqua Kure-Clear.
 - i. L&M Construction Chemicals, Inc.; L&M Cure R.
 - j. Meadows, W. R., Inc.; 1100 Clear.
 - k. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
 - l. Symons Corporation; Resi-Chem Clear.
 - m. Tamms Industries Inc.; Horncure WB 30.
 - n. Unitex; Hydro Cure 309.
 - o. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2.7 RELATED MATERIALS

- A. Expansion and Isolation Joint Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Wheel Stops: Precast, air-entrained concrete; 2500-psi minimum compressive strength; approximately 6 inches high, 9 inches wide, and 84 inches long. Provide chamfered corners and drainage slots on underside, and provide holes for dowel-anchoring to substrate.
 - 1. Dowels: Galvanized steel, diameter of $\frac{3}{4}$ inch, minimum length 10 inches.

- C. Slip Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- D. Bonding Agent: ASTM C 1059, Acrylic or styrene butadiene.
- E. Epoxy Adhesive: ASTM C 881, two-component material suitable for dry or damp surfaces. Provide material type, grade, and class to suit requirements.
- F. Pigment Mineral Dry-Shake Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
 - 1. Available Products:
 - a. Conspec Marketing & Manufacturing Co., Inc.; Conshake 600 Colortone.
 - b. Dayton Superior Corporation; Quartz Tuff.
 - c. Euclid Chemical Company (The); Surfex.
 - d. Lambert Corporation; Colorhard.
 - e. L&M Construction Chemicals, Inc.; Quartz Plate FF.
 - f. MBT Protection and Repair, ChemRex Inc.; Mastercron.
 - g. Metalcrete Industries; Floor Quartz.
 - h. Scofield, L. M. Company; Lithochrome Color Hardener.
 - i. Symons Corporation; Hard Top.
 - 2. Color: As selected by Architect from manufacturer's full range, to match campus standard color.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 4000 psi, 3500 psi, or 3000 psi as indicated on the drawings.
 - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: As specified by NCDOT Standard Specifications for class of concrete indicated.
 - 3. Slump Limit: Maximum 3.5 inches for non-vibrated, maximum 4 inches for vibrated.
- C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
 - 1. Air Content: 5-1/2 percent plus or minus 1.5 percent for 1-1/2-inch (38-mm) nominal maximum aggregate size.
 - 2. Air Content: 6 percent plus or minus 1.5 percent for 1-inch (25-mm) nominal maximum aggregate size.
 - 3. Air Content: 6 percent plus or minus 1.5 percent for 3/4-inch (19-mm) nominal maximum aggregate size.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use admixtures in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements as follows:
1. Fly Ash: 20 percent.
 2. Ground Granulated Blast-Furnace Slag: 50 percent.
 3. Combined Fly Ash, and Ground Granulated Blast-Furnace Slag: 50 percent, with fly ash not exceeding 20 percent.
- F. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd..

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116. Furnish batch certificates for each batch discharged and used in the Work.
1. When air temperature is between 85 deg F and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For concrete mixes of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 2. For concrete mixes larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

2.10 JOINT SEALANTS

- A. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.
- B. Round Backer Rod for Cold-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depths and pavement bottom-side adhesion of sealant.

2.11 DETECTABLE WARNING SURFACE TILES

- A. Tiles shall be designed to be cast-in-place within concrete pavement or sidewalks in compliance with ADA and ANSI requirements. Tiles shall be manufactured using matte finish exterior grade glass and carbon reinforced polyester based Sheet Molding Compound composite material with truncated domes containing fiberglass reinforcement. Tiles may also be manufactured of an epoxy polymer composition with an ultra-violet stabilized coating.
1. Color: Tiles shall be homogeneous in color and shall be selected by the Landscape Architect.
 2. Domes: Domes shall meet the spacing and dimensional requirements of section 705.5 of ANSI A117.1 and shall be compliant with ADA requirements.

- B. Tiles shall be as manufactured by ADA Solutions, Inc., Armor-Tile by Engineered Plastics, Inc, or approved equal.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Do not begin paving work until such conditions have been corrected and are ready to receive paving. Ensure subgrade is graded for proper drainage. Repair as needed to avoid ponding on final pavement surfaces.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.
- C. Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subbase.
- D. Place aggregate base courses as specified in Division 31 Section "Earth Moving".

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. 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 and screeds 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 inch 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 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.4 JOINTS

- A. General: Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

- B. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as indicated below unless shown otherwise on Drawings. Construct contraction joints for a depth equal to at least 1/3 of the concrete thickness, as follows:
1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.
 3. Inserts: Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.
 4. Spacing: Locate contraction joints at 10-ft max. intervals, each way in concrete pavement; 5-ft max. intervals, each way in concrete sidewalks/patios unless shown otherwise. Locate contraction joints in sidewalks less than 8-ft in width at 5-ft intervals across the walk. Locate contraction joints in sidewalks of 8-ft and greater width at 5-ft intervals across the walk and equally section the walk lengthwise with joints at 5-ft. max. intervals (example: an 8-ft wide walk shall have contraction joints at 5-ft. spacing across the walk and one joint dividing the walk lengthwise into two, equal 4-ft sections.)
- C. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2 hour, unless paving terminates at isolation joints.
1. Continue reinforcement across construction joints unless indicated otherwise. Do not continue reinforcement through sides of strip paving unless indicated.
 2. Provide tie bars at sides of paving strips where indicated.
 3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- D. Isolation (expansion) Joints: Form isolation joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints in curbs and sidewalks at intervals of 30 feet, each way, unless indicated otherwise.
 2. Extend joint fillers full width and depth of joint 1/2 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.
 3. Furnish 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.
 4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated
1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work. Ensure forms are set to ensure water will not pond on final surface.

- B. Remove snow, ice, or frost from base surface and reinforcing before placing concrete. Do not place concrete on surfaces that are frozen.
- C. Moisten base to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.
- D. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.
- E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- F. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with ACI 309R.
 - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.
- H. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.
- I. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
 - 1. 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.
- J. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.
 - 1. Spill Gutters: Form and install curb and gutter with gutter pans that spill at ¼" per foot slope away from the curb in the following locations.
 - a. Outside of the Public Right of Way: Provide spill gutter where curb and gutter is located adjacent to pavement surfaces that slope away from curb.
 - b. Within the Public Right of Way: Slope gutter per NCDOT Standard Drawing 846.01.
- K. Cold-Weather Placement: Comply with provisions of ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- L. Hot-Weather Placement: Place concrete complying with ACI 305R and as specified when hot weather conditions exist.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.
- M. Detectable Warning Surface Tiles: Install tiles in accordance with manufacturer's instructions in locations indicated on the plans and details. Set tiles in concrete or mortar base with mortar joints. Sand base and joints will not be allowed.

3.6 CONCRETE FINISHING

- A. Float Finish: Begin floating when bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/4 inch in 10 feet as determined by a 10-foot-long straightedge placed anywhere on the surface in any direction. Cut down high spots and fill low spots to ensure positive drainage and eliminate ponding. Refloat surface immediately to a uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across all site concrete sidewalk and pavement surfaces perpendicular to line of traffic to provide a uniform fine line texture finish.
 2. Very Fine Textured Broom Finish: Draw a very fine soft bristle broom across all concrete Play Area surfaces perpendicular to direction of play to provide a uniform fine line texture finish for concrete.
- B. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to a radius of 1/4-inch unless indicated otherwise on the drawings. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.
- C. Step Tread Grooves: Tool three (3) parallel grooves along entire top front edge of new concrete stair treads.
- D. Colored Stamped Pattern Finish: After initial floating, apply dry-shake materials to pavement surface according to manufacturer's written instructions. Embed color materials by power floating. After final floating, apply stamped pattern in pavement surface. Cure concrete with curing compound recommended by dry-shake hardener manufacturer. Apply curing compound immediately after final finishing.
1. Stamped Pattern:
 - a. Type 1: 6-inch wood plank (BST7370) by Butterfield Color or approved equal. See drawings for location.
 - b. Type 2: Hadley Creek Shale by Butterfield Color or approved equal. See drawings for location.
 - c. Type 3: Tree Stump End Stamp – A by Something Better Company or approved equal. See drawings for location.

3.7 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of ACI 306R for cold weather protection and ACI 305R for hot weather protection during curing.
- B. Evaporation Control: In hot, dry, and windy weather, protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before floating.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than 7 days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorbent cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with a 12-inch lap over adjacent absorbent covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 FIELD QUALITY CONTROL TESTING

- A. The Owner shall employ an independent testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement in accordance with Division 01 Section "Quality Control" and as follows:
 - 1. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive strength testing if adequate evidence of satisfactory strength is provided.
 - 2. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within one week of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective, or does not meet the requirements of this Section.
- B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.
- E. Remove and replace concrete paving or curb and gutter that ponds water.

END OF SECTION

SECTION 32 14 00 - UNIT PAVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Brick pavers set in aggregate setting bed.
 - 2. Edge restraints for unit pavers.
- B. Related Sections include the following:
 - 1. Division 31 Section "Earth Moving" for compacted subgrade and subbase course, if any, under unit pavers.
 - 2. Division 32 Section "Concrete Paving" for cast-in-place concrete curbs and gutters serving as edge restraint for unit pavers.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Brick pavers.
 - 2. Bituminous setting materials.
 - 3. Edge restraints.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of unit paver indicated.
- C. Samples for Verification: Full-size units of each type of unit paver indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
 - 1. Include Samples of exposed edge restraints.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect unit pavers and aggregate during storage and construction against soiling or contamination from earth and other materials.
 - 1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.
- B. Store liquids in tightly closed containers protected from freezing.

1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Concrete Unit Pavers: The following manufacturer was used as the basis for design. Product by other manufacturers providing equal products may be allowed:
 - 1. Belgard Hardscapes, Inc

2.2 COLORS AND TEXTURES

- A. Colors and Textures: To be selected by architect from manufacturer's full range of colors and blends. .

2.3 UNIT PAVERS

- A. Unit Pavers: Pavers shall be 4-inch wide x 8-inch long x 2-3/8-inch tall Holland Stone concrete unit pavers as manufactured by Belgard Hardscapes or approved equal complying with the quality specifications for solid concrete interlocking paving units as required by ASTM C936.

2.4 ACCESSORIES

- A. Aluminum Edge Restraints: Commercial medium duty aluminum brick paver edging with holes to receive stakes at 24 inches (610 mm) o.c., and 3/8 inch spiral steel stakes 10 inches (254 mm) long for each hole. Attach sections per manufacturer's recommendation. BrickBloc by Permaloc or approved equal. Size of edging is as follows:
 - 1. 0.75 inch (1.9 mm) thick by 1-3/4 inches (44.5 mm) high.
- B. Job-Built Concrete Edge Restraints: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mixed concrete with minimum 28-day compressive strength of 3000 psi (20 MPa).

2.5 AGGREGATE SETTING-BED MATERIALS

- A. Graded Aggregate for Subbase: Aggregate base course material.
- B. Geotextile: Woven or nonwoven geotextile manufactured from polyester or polypropylene fibers, with a permeability rating 10 times greater than that of soil on which paving is founded and an apparent opening size small enough to prevent passage of fines from leveling course into graded aggregate of base course below.

- C. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregate.
- D. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Where pavers are to be installed over waterproofing, examine waterproofing installation, with waterproofing Installer present, for protection from paving operations. Examine areas where waterproofing system is turned up or flashed against vertical surfaces and horizontal waterproofing. Proceed with installation only after protection is in place.

3.2 PREPARATION

- A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- B. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
- C. Proof-roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase for unit pavers.

3.3 INSTALLATION, GENERAL

- A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.
- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
- D. Joint Pattern: See plans for pattern style.
- E. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- F. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
 - 1. For metal edge restraints with top edge exposed, drive stakes at least 1 inch (25 mm) below top edge.
 - 2. Install job-built concrete edge restraints to comply with requirements in Division 3 Section "Cast-in-Place Concrete."
 - 3. Where pavers embedded in concrete are indicated as edge restraints for pavers set in aggregate setting bed, install pavers embedded in concrete and allow concrete to cure before placing aggregate setting bed and remainder of pavers. Hold top of concrete below aggregate setting bed.

- G. Provide steps made of pavers as indicated. Install paver steps before installing adjacent pavers.
 - 1. Where pavers set in mortar bed are indicated for steps constructed adjacent to pavers set in aggregate setting bed, install steps and allow mortar to cure before placing aggregate setting bed and remainder of pavers. Cut off mortar bed at a steep angle so it will not interfere with aggregate setting bed.

3.4 AGGREGATE SETTING-BED PAVER APPLICATIONS

- A. Compact soil subgrade uniformly to at least 95 percent of ASTM D 1557 laboratory density.
- B. Place geotextile over prepared subgrade, overlapping ends and edges at least 12 inches (300 mm).
- C. Place aggregate subbase and base in thickness indicated. Compact by tamping with plate vibrator and screed to depth required to allow setting of pavers.
- D. Place leveling course and screed to a thickness of 1 to 1-1/2 inches (25 to 38 mm), taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.
- E. Treat leveling base with soil sterilizer to inhibit growth of grass and weeds.
- F. Set pavers with a minimum joint width of 1/16 inch (1.6 mm) and a maximum of 1/8 inch (3 mm), being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars. Use string lines to keep straight lines. Fill gaps between units that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
 - 1. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
- G. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf (16- to 22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions:
 - 1. After edge pavers are installed and there is a completed surface or before surface is exposed to rain.
 - 2. Before ending each day's work, fully compact installed concrete pavers to within 36 inches (900 mm) of the laying face. Cover open layers with nonstaining plastic sheets overlapped 48 inches (1200 mm) on each side of the laying face to protect it from rain.
- H. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.
- I. Do not allow traffic on installed pavers until sand has been vibrated into joints.
- J. Repeat joint-filling process 30 days later.

3.5 REPAIR, CLEANING, AND PROTECTION

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

END OF SECTION

SECTION 32 40 00 - SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Backed Benches.
2. Backless Benches
3. Bicycle Racks
4. Trash Receptacles
5. Tables
6. Game Tables
7. 'Lungo Mare' Bench
8. Adirondack Chair

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: For each type of exposed finish and for each color and texture required.

C. Material Certificates: For the following:

1. Recycled plastic.

D. Maintenance data.

PART 2 - PRODUCTS

2.1 BACKED BENCHES

A. Products:

1. 64" Long, High Density Paper Composite seated, solid cast aluminum framed bench with the Maglin Powdercoat System finish. Model #MLB870-PCS by Maglin Site Furniture. (#1-800-716-5506) or approved equal.

B. Frame: Solid Cast Aluminum, per manufacturer.

C. High Density Paper Composite (HDPC) Seat

1. Description: Per manufacturer.
2. Color: Sandstone

D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.

E. Finish: Frame shall be powder-coated.

1. Color: Black Fine Tex.

2.2 BACKLESS BENCHES

A. Products:

1. 54.4" Long, High Density Paper Composite seated, solid cast aluminum framed bench with the Maglin Powdercoat System finish. Model #SCB1600B-PCS by Maglin Site Furniture. (#1-800-716-5506) or approved equal.

B. Frame: Solid Cast Aluminum, per manufacturer.

C. High Density Paper Composite (HDPC) Seat

1. Description: Per manufacturer.
2. Color: Sandstone

D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.

E. Finish: Frame shall be powder-coated.

1. Color: Black Fine Tex.

2.3 BICYCLE RACKS

A. Products:

1. Solid cast aluminum bike rack, SCBR1600-S bike rack by Maglin Site Furniture 1-800-716-5506 (www.maglin.com) or approved equal.
2. Engraved bike symbol on top cross member.
3. Dimensions:
 - a. Length: 27.62"
 - b. Height: 25.19"
 - c. Width: 3.375"

B. Style: Contemporary, capacity: 2.

C. Security: Designed to lock wheel and frame.

D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.

E. Finish: All surfaces shall be powder-coated.

1. Color: Slate Fine Tex.

2.4 TRASH RECEPTACLES

A. Products:

1. Receptacles constructed out of steel panels with plasma-cut grass motif. Removable black polyethylene liner included. Lakeside Litter Receptacle by Landscape Forms, Inc., 1-800-521-2546 (www.landscapeforms.com) or approved equal.
2. Dimensions:
 - a. Height: 36"
 - b. Diameter: 21"

- B. Style: Side-Opening
- C. Capacity: 30 Gallons
- D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.
- E. Finish: All surfaces shall be powder-coated.
 - 1. Color: Matte Black.

2.5 TABLES

- A. Products:
 - 1. Round 12-gauge steel table with four contour seats with and two wheelchair accessible positions. L1740 Cosmopolitan Table by Anova Furnishings, 1-800-231-1327 (www.anovafurnishings.com) or approved equal.
 - 2. Dimensions:
 - a. Table Height: 30.12"
 - b. Table Diameter: 46.25"
- B. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.
- C. Finish: Table top and seats shall be coated with a Fusion Advantage Finish to prevent rust, fading, chipping, cracking, mold and mildew. Frame and legs shall be galvanized steel and powder coated to prevent rusting.
 - 1. Color: Submit manufacturer's full range of colors to Landscape Architect for selection.

2.6 GAME TABLES

- A. Products:
 - 1. 25-1/4" Square Game Table with two 22-3/4"x20" backed seats. High Density Polyethelene seats. Steel frame with the zinc rich epoxy coating with polyester powder coated finish. Model #78-32PL by DuMor, inc. 1-800-598-4018 or approved equal.
- B. Frame: Steel, per manufacturer. All fasteners and hardware shall be corrosion resistant.
- C. High Density Polyethylene Seat
 - 1. Description: Per manufacturer.
 - 2. Color: Walnut
- D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.
- E. Finish: Frame shall be coated with a zinc rich epoxy then finished with a polyester powder coating.
 - 1. Color: Recycle Green.

2.7 LUNGO MARE BENCH

- A. Products:

1. 158" Long x 79" Wide backless wave shaped stone freestanding element. Lungo Mare Bench, Style A by Landscape Forms, Inc., 1-800-521-2546 (www.landscapeforms.com) or approved equal.

B. Material: Reinforced cast stone (concrete), per manufacturer.

C. Installation Method: Surface mount, per manufacturer.

D. Finish: Acid-etched finish.

1. Color: Submit manufacturer's full range of colors to Landscape Architect for selection.

2.8 ADIRONDACK CHAIRS

A. Products:

1. Reclined, contoured backed maintenance free Adirondack Chair constructed out of Durawood Poly Lumber. Durawood Essential Adirondack Chair Item # DWAC1-K by Pawleys Island Furniture - Nags Head Hammocks 1-800-344-6433 or approved equal.

B. Frame: Durawood Poly Lumber, per manufacturer. All fasteners and hardware shall be marine-grade, 316 stainless steel.

C. Color: Submit manufacturer's full range of colors to Landscape Architect for selection.

D. Installation Method: Surface mount, per manufacturer. Mounting hardware shall be stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Complete field assembly of site furnishings, where required.

B. Unless otherwise indicated, install site furnishings after paving have been completed.

C. Install site furnishings level, plumb, true, and securely positioned at locations indicated on Drawings in accordance with manufacturer's printed instructions.

END OF SECTION

SECTION 33 10 01 – SITE WATER UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes water systems piping for potable water service and fire protection service outside the building.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 16 Sections for water distribution systems inside building.

1.3 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure Ratings: Except where otherwise indicated, the following are minimum pressure requirements for water system piping.
 - 1. Underground Piping: 150 psig.
 - 2. Underground Piping, Downstream of Fire Department Connections: 200 psig.

1.4 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data, including pressure rating, rated capacity, and settings of selected models for the following:
 - 1. Valves.
 - 2. ~~Fire hydrants and fire department connections.~~
 - 3. Identification materials and devices.
 - 4. Pipe and Fittings.
- C. Shop drawings for precast concrete pits. Include frames and covers. Include drains when indicated.
- D. Shop drawings for cast-in-place concrete valve and meter pits. Include frames and covers. Include drains when indicated.
- E. Record drawings at Project closeout of installed water system piping and products according to Division 1 Section "Project Closeout."
- F. As-Built Survey of installed water system piping and products as specified in "Quality Assurance" Article below.
- G. Test reports specified in "Field Quality Control" Article in Part 3.

1.5 QUALITY ASSURANCE

- A. All materials, construction methods and testing shall comply with the requirements of the AWWA.

- B. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.
- C. Listing and Labeling: Provide equipment and accessories that are listed and labeled.
 - 1. The Terms "Listed" and "Labeled": As defined in "National Electrical Code," Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
- D. Product Options: Water systems specialties and accessories are based on specific types, manufacturers, and models indicated. Components by other manufacturers but having equal performance characteristics may be considered, provided deviations in dimensions, operation, and other characteristics do not change design concept or intended performance as judged by Architect / Engineer. The burden of proof of equality of products and approval of substitutes is on Contractor. Refer to Division 1 Section "Product Substitutions."
- E. All work within any NCDOT right-of-way shall conform to the requirements of the current version of the NCDOT's Policies and Procedures for Accommodating Utilities on Highway Rights of Way, the provisions and conditions of the encroachment agreement(s), and other applicable NCDOT standards and policies. The encroachment agreement(s) are considered part of the project specifications by reference. Copies of the agreement(s) will be provided upon request from the Architect / Engineer.
- F. As-Built Survey / Record drawings at Project closeout of installed water system piping and products. As-built survey shall be signed and seal by a NC Professional Land Surveyor and shall include the following:
 - 1. ~~All fire hydrant water valve sizes and locations with no less than two primary reference dimensions from permanent above grade features.~~
 - 2. ~~Locations of bacteriological sampling points.~~
 - 3. Pipe materials and sizes.
 - 4. Other water system components such as meters, backflow preventers, etc.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Preparation for Transport: Prepare valves, including fire hydrants, for shipping as follows:
 - 1. Ensure that valves are dry and internally protected against rust and corrosion.
 - 2. Protect valves against damage to threaded ends, flange faces, and weld ends.
 - 3. Set valves in best position for handling. Set valves closed to prevent rattling.
- B. Storage: Use the following precautions for valves, ~~including fire hydrants~~, during storage:
 - 1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
 - 2. Protect valves from weather. Store valves indoors and maintain temperature higher than ambient dew point temperature. Support valves off ground or pavement in watertight enclosures when outdoor storage is necessary.
- C. Handling: Use sling to handle valves ~~and fire hydrants~~ whose size requires handling by crane or lift. Rig valves to avoid damage to exposed valve parts. Do not use handwheels or stems as lifting or rigging points.
- D. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
- E. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

- F. Protect flanges, fittings, and piping specialties from moisture and dirt.
- G. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.
- B. Verify that water system piping may be installed in compliance with original design and referenced standards.
- C. Site Information: Reports on subsurface condition investigations made during the design of the Project are available for informational purposes only; data in reports are not intended as representations or warranties of accuracy or continuity of conditions (between soil borings). Owner assumes no responsibility for interpretations or conclusions drawn from this information.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate inspections and connection to water main with the authorities having jurisdiction (Town of Nags Head). Obtain all necessary permits for pavement cuts, line taps, etc. from the authorities having jurisdiction. Conduct pre-installation meeting with inspectors and notify Architect / Engineer immediately of conflicts with drawings or specifications.
- B. Coordinate with pipe materials, sizes, entry locations, and pressure requirements of ~~building fire protection and~~ building water distribution systems piping.
- C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work are specified herein. Products by other manufacturers having equal performance characteristics may be considered, however approval must be acquired by the Contractor from the Town of Nags Head.

2.2 PIPES AND TUBES

- A. Ductile-Iron Pipe: AWWA C150 and C151, Pressure Class 350.
 - 1. Lining: AWWA C104, cement mortar, seal coated.
 - 2. Gaskets, Glands, and Bolts and Nuts: AWWA C111.
 - 3. Push-On-Joint-Type Pipe: AWWA C111, rubber gaskets.
 - 4. Mechanical-Joint-Type Pipe: AWWA C111, rubber gaskets, ductile- or cast-iron glands, and steel bolts and nuts.
 - 5. Coating: AWWA C151, bituminous coating.
- B. Copper Tube: ASTM B 88, Type K, seamless water tube, annealed temper. All copper pipe shall be NSF Listed for potable use.

2.3 PIPE AND TUBE FITTINGS

- A. Ductile-Iron and Cast-Iron Pipe Fittings: AWWA C110, ductile-iron or cast-iron, 250-psig minimum pressure rating; or AWWA C153, ductile-iron compact fittings, 350-psig pressure rating.
 - 1. Lining: AWWA C104, cement mortar.
 - 2. Gaskets: AWWA C111, rubber.
 - 3. Joints: AWWA C111, mechanical joint, all bell.
 - 4. Coating: AWWA C151, bituminous coating.

2.4 VALVES

- A. Nonrising Stem Gate Valves 3 Inches and Larger: AWWA C509, resilient seated; bronze stem, cast-iron or ductile-iron body and bonnet, stem nut, 200-psig working pressure, mechanical joint ends.
- B. Post Indicator Valves: NRS, UL 262, FM approved, iron body and bonnet with flange for indicator post, bronze seating material, inside screw, 175-psig working pressure, mechanical joint ends.
- C. Rising Stem Gate Valves 3 Inches and Larger for installation in vaults or other enclosure: AWWA C509, resilient seated; OS&Y, bronze stem, cast-iron or ductile-iron body and bonnet, stem nut, 200-psig working pressure, flanged ends.
- D. Valve Boxes: Cast-iron box having top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.
 - 1. Provide a steel tee-handle operating wrench with each valve box. Wrench shall have tee handle with one pointed end, stem of length to operate valve, and socket-fitting valve-operating nut.
- E. Indicator Posts: UL 789, FM-approved, vertical type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve. Post indicator valves (PIVs) on fire protection systems shall be equipped with a supervisory switch.
- F. ~~Tapping Sleeve and Tapping Valve: Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.~~
 - 1. ~~Tapping Sleeve: Mueller mechanical joint, Mueller Outlet Seal, American Uniseal or Kennedy Square Seal. One hundred percent stainless steel sleeves may also be used, as manufactured by Rockwell, Romac, or Ford provided that all metallic parts of the sleeves are 100% stainless steel including bolts and nuts. All sleeves shall have a minimum of 150 psi working pressure. All taps shall be machine drilled, no burned taps will be allowed.~~

2.5 WATER METERS (BY OWNER)

- A. Domestic Water Meters: Meters shall be provided and installed by the Town of Nags Head. The Contractor shall coordinate installation directly with the Town of Nags Head Water Dept. The Town is responsible for all meter costs and installation fees.
- B. Detector-Type Water Meter: Refer to backflow preventer specification.
- C. All meter boxes shall be provided by the Town of Nags Head as detailed on the drawings.

2.6 FIRE HYDRANTS

- A. ~~General: Cast iron body, compression type valve, opening against pressure and closing with pressure, 6-inch mechanical joint inlet, 150-psig working pressure, break-away impact type. Hydrants shall be~~

~~Kennedy K81 A Dry Top with Bronze Bushed Shoe, Mueller Centurion A421 with Bronze Bushed Shoe or American Mark 73.~~

- ~~B. Outlet Threads: NFPA 1963, external hose nozzles with National Standard Threads. Include cast iron caps with steel chains.~~
- ~~C. Operating and Cap Nuts: Pentagon 1 1/2 inch point to flat.~~
- ~~D. Direction of Opening: Open hydrant valve by turning operating nut to the left, or counterclockwise.~~
- ~~E. Finish: "Safety Red" per current _____ requirements.~~
- ~~F. Dry Barrel Fire Hydrants: AWWA C502, two 2 1/2 inch and one 5 inch Storz outlets, 4 1/2 inch main valve, drain valve, and 6 inch mechanical joint inlet. Bronze to bronze threads shall be provided between the hydrant seat or seat ring and the seat attaching assembly. All hydrants shall include cast or ductile epoxy lined shoe, rubber drain seals and positive, protective valve stop device.~~

2.7 FIRE DEPARTMENT CONNECTIONS

- ~~A. Exposed, Sidewalk Fire Department Connections: 5 in x 4 in with 30 deg turndown, 5 in Storz connection inlet, 4 in female NPS outlet. Include cap and chain; fixed (no swivel) connection. Connect to galvanized steel elbow and FDC pipe; and round sidewalk escutcheon plate marked "AUTO SPRKLR". Provide 1 in, 1/4 (quarter) turn valve tapped into FDC pipe at 12 in above finish grade.~~
- ~~B. Wafer Check Valve: UL Listed/FM Approved, ductile iron body, bronze clapper and seat ring, 'O' ring seals, stainless spring closure, with 1/2" ball drip valve below seat to allow valve to drain water from FDC.~~
- ~~C. Signage: Approx. 18"x10", steel, white background with min. 6" red lettering, marked FDC, mounted on a galvanized steel pole with concrete footing. Mounting height to bottom of sign: 5 ft. min.~~

2.8 BACKFLOW PREVENTERS (BY CONTRACTOR)

- A. General: As listed as approved by The Town of Nags Head.
- B. Reduced Pressure (RP or RPZ) Backflow Preventers – 3/4" thru 2": ASSE 1013, AWWA C511, CSA B64 Certified and USC Foundation for Cross Connection Control and Hydraulic Research approved with full port, resilient seated ball valve shut-off valves and ball valve test cocks. Include 2 spring loaded, center stem guided check valves and one hydraulically dependednt differential relief valve.
- C. Reduced Pressure Detector Assembly (RPDA) Backflow Preventers – 2-1/2" thru 10": ASSE 1047, USC Foundation for Cross Connection Control and Hydraulic Research approved, FM approved and UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include test cocks and pressure-differential relief valve with ASME A112.1.2 air gap fitting located between 2 positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and reduced pressure backflow preventer, for continuous-pressure application. Assembly shall be of a compact design utilizing a flow orientation of inlet flow vertical up, outlet flow vertical down at the direct outlet of the gate valves. General style, type, quality and character of RPDA Backflow Preventers are Wilkins Model 475DA, Watts Model 909 RPDA, Ames Colt Series C500 or approved equal. ~~Gate valves on backflow preventers on fire protection systems shall be equipped with supervisory switches.~~

2.9 ANCHORAGES

- A. Clamps, Straps, and Washers: ASTM A 506, steel.
- B. Rods: ASTM A 575, steel.

- C. Rod Couplings: ASTM A 197, malleable iron.
- D. Bolts: ASTM A 307, steel.
- E. Cast-Iron Washers: ASTM A 126, gray iron.
- F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psi.
 - 1. Cement: ASTM C 150, Type I.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
 Bags of concrete mix may be substituted with number and size of bags as determined by Engineer/Architect.

2.10 IDENTIFICATION

- A. Metallic-Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

2.11 PROTECTIVE ENCLOSURES

- A. General: Manufactured, weather-resistant enclosure designed to protect aboveground water piping equipment or specialties. Enclosures shall be sized as required for access and service of protected unit. Enclosures for compact design backflow preventors shall be no larger than 64"(L)x60"(W)x60"(H) General style, type, quality and character of Enclosures are as manufactured by Hot Box, Watts, safe-T-Cover or approved equal.
 - 1. Housing: Reinforced-aluminum or reinforced-fiberglass construction. Color to be selected by Owner from full standard color selections.
 - 2. Drain opening: Sized to alleviate a full release by the backflow preventer.
 - 3. Access doors with locking device.
 - 4. Insulation inside housing.
 - 5. Electric heater with self-limiting temperature control (for 2-1/2" or larger backflow preventers) or plug-connected pipe heating cable (for 2" and smaller backflow preventors) and connection to power supply. Heating equipment shall be designed and furnished by the enclosure manufacturer.
 - 6. Concrete base slab: 4 inch thick of dimensions required to extend at least 6 inches beyond edges of housing. Provide PVC sleeves through base slab for water piping to prevent contact between concrete and piping.
 - 7. Anchoring devices to attach housing to base with stainless steel mouting hardware.

PART 3 - EXECUTION

3.1 GENERAL

- A. All construction shall conform to the requirements of the Town of Nags Head and the NCDOT as applicable in addition to the requirements state herein.

3.2 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.3 SERVICE ENTRANCE PIPING

- A. Extend water system piping and connect to water supply source and building water distribution ~~and fire protection~~ systems at 5-foot outside face of the building wall in locations and pipe sizes indicated.
 - 1. Terminate water system piping at 5-foot outside building wall until building water systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building water systems when those systems are installed.
- B. Install restrained joints for buried piping within 60 inches of building. Use restrained-joint pipe and fittings, thrust blocks, anchors, tie-rods and clamps, and other supports at vertical and horizontal offsets.

3.4 JOINT CONSTRUCTION

- A. Ductile-Iron Piping Gasketed Joints: Construct joints according to AWWA C600.
- B. Flanged Joints: Align flanges and install gaskets. Assemble joints by sequencing bolt tightening. Use lubricant on bolt threads.

3.5 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. General Locations and Arrangements: Drawings indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated except where deviations to layout are approved on coordination drawings.
- B. Install piping at indicated slope.
- C. Install components having pressure rating equal to or greater than system operating pressure.
- D. Install piping free of sags and bends.
- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install fittings for changes in direction and branch connections.
- G. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
 - 1. Install unions, in piping 2 inches and smaller, adjacent to each valve and at final connection to each piece of equipment having 2-inch or smaller threaded pipe connection.
 - 2. Install flanges, in piping 2-1/2 inches and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
 - 3. Install dielectric fittings to connect piping of dissimilar metals.

3.6 PIPING INSTALLATION

- A. Water Main Connection: Tap water main with size and in location as indicated according to requirements of water utility. (BY OWNER)
 - 1. Install tapping sleeve and tapping valve according to manufacturer's installation instructions.
 - 2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
 - 3. Install gate valve onto tapping sleeve. Comply with AWWA C600. Install valve with stem pointing up and with cast-iron valve box.
 - 4. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water service piping.

5. Install service clamps and corporation stops in size, quantity, and arrangement required by utility company standards and according to manufacturer's installation instructions.
6. Install service clamps on pipe to be tapped. Position outlet for corporation stop.
7. Install corporation stops into service clamps. Install valve with stem pointing up and with cast-iron valve box.
8. Install curb stop in service piping with head pointing up and with cast-iron service box.
9. Install manifold for multiple taps in water main.
10. Use drilling machine compatible with service clamp and corporate stop. Drill hole in main. Remove drilling machine and connect water service piping.

B. ~~Comply with requirements of NFPA 24 for materials and installation.~~

C. Install ductile-iron pipe and ductile-iron and cast-iron fittings according to AWWA C600.

D. Install copper tube and wrought-copper fittings according to CDA No. 404/0 "Copper Tube Handbook."

E. Bury piping at minimum depth of 48 inches below finished grade and not less than 18 inches below average local frost depth.

F. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

G. Shoring or bracing of pits, trenches and other excavations shall be in accordance with the requirements of NCDOT and OSHA.

H. The subgrade at the bottom of the trench shall be shaped to secure uniform support throughout the length of the pipe. A space shall be excavated under the bell of each pipe to provide space to relieve bearing pressure on the bell and provide room to adequately make the joint.

I. Open ends of pipe shall be plugged with a standard plug or cap at all times when pipe laying is not in progress. Trench water shall not be permitted to enter pipe.

J. Backfill material shall be free from stones greater than 4-inches in diameter, construction material debris, frozen material, organic matter, or unstable material. Backfill materials shall be placed in loose lifts of 8-inches or less in depth. All backfill shall be compacted to not less than 95% of the standard Proctor maximum dry density except the final foot beneath pavement or slab areas where this requirement shall be increased to 98% of the standard Proctor maximum dry density.

K. ~~Install and test fire protection piping and appurtenances in accordance with the specific requirements of the _____ and applicable NFPA requirements.~~

3.7 ANCHORAGE INSTALLATION

A. Anchorages: Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Gasketed-Joint, Ductile-Iron Piping: According to AWWA C600.
2. ~~Fire Service Piping: According to NFPA 24.~~

B. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.8 BACKFLOW PREVENTER INSTALLATION (BY CONTRACTOR)

- A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to plumbing and health department authorities having jurisdiction.
- B. Do not install bypass around backflow preventer.
- C. Do not install reduced-pressure-principle-type in pit.
- D. Support backflow preventers, valves, and piping on 3000-psi minimum, portland-cement-mix concrete piers.

3.9 IDENTIFICATION INSTALLATION

- A. Install continuous plastic underground warning tape during back-filling of trench for underground water service piping. Locate 6 inches to 8 inches below finished grade, directly over piping.
- B. Attach nonmetallic piping label permanently to main electrical meter panel.

3.10 FIELD QUALITY CONTROL

- A. Piping Tests: Water mains shall be tested in the following general sequence:
 1. "Pigging" main (mains less than 16-in diameter);
 2. Flush the main;
 3. Perform hydrostatic tests;
 4. Introduce the appropriate amount of chlorine by tapping the main;
 5. Hold chlorine solution in main;
 6. Flush the main;
 7. Sample and perform bacteriological tests;
 8. Backfill pipe.
- B. All tests shall be performed under the observation of the Town of Nags Head.
- C. Only potable water shall be used.
- D. Hydrostatic Tests: Test at not less than 1-1/2 times working pressure for 2 hours.
 1. All main installations shall be pressure tested between each main line valve in accordance with AWWA C600, Section 4. The test shall be performed using a suitable pump and an accurate pressure gauge. Immediately upon completion of a section of main, 150 psi (+/- 5 psi) of pressure shall be applied and held for 2 hours. The acceptable leakage rate shall not exceed 0.092 gallons per inch of pipe diameter per 1,000 feet of pipe per hour.
 2. Failure of the water main to comply with the above acceptable leakage rate, shall require the contractor to replace any defective materials to insure a watertight installation. After any inadequacies have been corrected, the leakage rate shall again be tested. The test shall be repeated until that portion of the main is brought into compliance with the permissible leakage rate.
- E. Chlorination
 1. All additions or replacements to the water system, including ~~fire lines and~~ backflow prevention devices, shall be chlorinated prior to being placed into service. Such chlorination shall be performed under the observation of the Town of Nags Head.
 2. Pipe subjected to contaminating materials shall be treated as directed by the Engineer. Should such treatment fail to cleanse the pipe, replacement shall be required. The Owner and Engineer shall bear no portion of any cost sustained by the contractor in meeting this specification.

3. Chlorination of a completed line shall be carried out after completing the pressure test and in the following manner:
 - a. Tap will be made at the control valve at the upstream end of the line and at all extremities of the line including valves. These taps shall be located in such a manner as to allow HTH solution to be fed into all parts of the line.
 - b. A solution of water containing high test hypochlorite (70%) available chlorine or chlorine gas solution shall be introduced into the line by regulated pumping at the control valve tap. The solution shall be of such a concentration that the line shall have a uniform concentration of 50-ppm total chlorine immediately after chlorination. The chart below shows the required quantity of 70% HTH compound to be contained in the solution in each 1000-foot section of line to produce the desired concentration of 50-ppm.

Pipe Size (in)	Lbs. of HTH (70%) Per 1000-ft of Pipe
6	0.88
8	1.56
10	2.42
12	3.50

- c. The HTH solution shall be circulated in the main by opening the control valve and systematically manipulating hydrants and taps at the line extremities. The HTH solution must be pumped in at a constant rate for each discharge rate in order that a uniform concentration will be produced in the mains.
- d. Service lines shall be sterilized by methods acceptable to the Town of Nags Head, and the contractor shall have the same responsibility for the laterals as for mains in regard to bearing the full cost of any corrective measures needed to comply with bacteriological or other requirements.
- e. The HTH solution shall remain in lines for no less than 24-hours.
- f. Extreme care shall be exercised at all times to prevent the HTH solution from entering existing mains.

F. Bacteriological Sampling

1. Free residual chlorine after 24-hours shall be at least 10 ppm, or the lines shall be re-chlorinated.
2. Mains shall be flushed with a blow-off assembly of sufficient size to effectively clean the main. Flushing of lines may proceed after 24-hours of chlorination, provided free residual chlorine analysis is satisfactory. Flushing shall be continued until an orthotolidine check shows that the lines contain only the normal chlorine residual.
3. Samples for bacteriological analysis shall be collected for each section of pipe between main line valves by the Town of Nags Head after flushing is completed. The contractor shall furnish such assistance as may be required to secure the samples.
4. In the event that two successive bacteriologic tests fail, that section of the main shall be re-chlorinated by the contractor and new tests performed prior to moving to the next section of main.

END OF SECTION 331001

SECTION 33 40 00 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes site drainage systems outside the building. Systems include the following:
 - 1. Storm drainage.
 - 2. Foundation drainage connections outside of building.
 - 3. Roof drainage connections outside of building.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Division 31 Section "Earth Moving."
 - 2. Division 31 Section "Erosion Controls."
 - 3. Division 03 Section "Cast-In-Place Concrete."
 - 4. Division 22 Sections for storm drainage inside the building.

1.3 DEFINITIONS

- A. Drainage Piping: System of pipe, fittings, and appurtenances for gravity flow of storm drainage.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.
- B. As-Built Survey / Record drawings at Project closeout of installed drainage system piping and basins and all stormwater management devices (ponds, wetlands, bio-retention areas). As-built survey shall be signed and seal by a NC Professional Land Surveyor and shall include the following:
 - 1. All basin locations with no less than two primary reference dimensions from permanent above grade features.
 - 2. As-built rims and inverts noted.
 - 3. Pipe materials and sizes, plus slopes and distances between structures.
 - 4. As-built dimensions for installed riprap dissipater pads.
 - 5. Topography of embankments and interiors of drained stormwater management ponds, wetlands and bio-retention cells. Topography shall include all survey point elevations.
 - 6. Detailed as-built dimensions and elevations of stormwater management device outlet structures, weirs, orifices, and outlet pipes.
 - 7. Stormwater treatment devices and cistern locations and elevations.

1.5 QUALITY ASSURANCE

- A. Environmental Agency Compliance: Comply with regulations pertaining to storm drainage systems.
- B. Utility Compliance: Comply with regulations pertaining to storm drainage systems.

- C. Product Options: Drawings indicate sizes, profiles, connections, and dimensional requirements of system components and are based on specific manufacturer types indicated. Other manufacturers' products with equal performance characteristics may be considered. Refer to Division 01 Section "Products."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures in direct sunlight.
- B. Do not store plastic pipe or fittings in direct sunlight.
- C. Protect pipe, pipe fittings, and seals from dirt and damage.

1.7 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted under the following conditions and then only after arranging to provide acceptable temporary utility services.
 - 1. Notify Architect / Engineer not less than 48 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without receiving Architect / Engineer's written permission.

1.8 SEQUENCING AND SCHEDULING

- A. Coordinate storm drainage system connections to utility company's storm sewer.
- B. Coordinate storm drainage system connections to existing on-site storm sewer.
- C. Coordinate with interior building drainage systems.
- D. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

- A. General: Refer to plans for specific pipe material applications.
- B. Ductile-Iron Pipe: ANSI/AWWA C150/A21.50 and C151/A21.51, minimum pressure class 250.
 - 1. Lining: AWWA C104, cement mortar, coal tar epoxy lined.
 - 2. Gaskets, Glands, and Bolts and Nuts: AWWA C111.
 - 3. Push-On-Joint-Type Pipe: AWWA C111, rubber gaskets.
 - 4. Coating: AWWA C151, bituminous coating.
- C. Polyvinyl Chloride (PVC) Sewer Pipe and Fittings: ASTM D-1785, SCH 40 PVC for solvent-cemented or gasketed joints.
 - 1. Primer: ASTM F 656.
 - 2. Solvent Cement: ASTM D 2564.
 - 3. Gaskets: ASTM F 477, elastomeric seal.

- D. Reinforced-Concrete Sewer Pipe and Flared End Sections: ASTM C 76, Class III.
 - 1. Standard Joints: Mortar or plastic cement putty seal meeting Federal Specification SS-S-00210.
 - 2. Watertight Joints: O-ring rubber gasket meeting ASTM C-443. Watertight joints shall be provided at outlet pipes that penetrate pond embankments and other locations specified on the drawings.

- E. High Density Polyethylene (HDPE) Pipe and Fittings and Flared End Sections: AASHTO M252, M294, MP6, or MP7. Smooth interior and corrugated exterior. All sizes shall conform to the AASHTO classification Type S or D. N-12 or N-12HP by ADS, N-12 HP by Hancor, Inc., Eagle Green PE by JM Eagle, or approved equal.
 - 1. Standard Joints: Silt-tight, rubber gasket, ASTM F477, bell and spigot.
 - 2. Watertight Joints: Watertight per ASTM D3212, AASHTO M294, MP6 or MP7, bell and spigot, rubber gasket, ASTM F477.
 - 3. Fittings: AASHTO M252, M294, MP6 or MP7, welded on the interior and exterior at all junctions. Only fittings supplied or recommended by the pipe manufacturer shall be used.

2.2 SPECIAL PIPE COUPLINGS AND FITTINGS

~~A. Connection from roof downspout to underground storm pipe.~~

- ~~1. Vertical stainless steel downspout adapter with sch. 40 PVC pipe outlet sized to fit over downspout and underground piping. Adapter shall have a self cleaning debris trap consisting of a hinged cover and removable debris screen. Powder coat color to be selected by Architect / Engineer from manufacturer's full range of colors. As manufactured by Piedmont Pipe Construction.~~

2.3 DRAINAGE INLETS

- A. Catch Basins and Drop Inlets: Brick and mortar, of depth, shape, and dimensions indicated. Precast concrete basins may be used in lieu of brick upon approval by the Architect / Engineer. All structures shall be designed to withstand AASHTO H-20 loads.
 - 1. Base, Channel, and Bench: Concrete.
 - 2. Wall: ASTM C 32, Grade MS, clay brick masonry units.
 - a. Option: ASTM C 55, Grade S-II, solid concrete brick masonry units may be used instead of clay brick.
 - 3. Mortar: ASTM C 270, Type S, using ASTM C 150, Type I, portland cement.
 - 4. Grout for Pond/Wetland/BMP Installations: ASTM C1107, non-shrink, hydraulic cement grout.

- B. Frames and Grates: ASTM A48, Class 35B, cast iron, H-20 loading. Include flat grate with small square or short-slotted drainage openings as indicated on the drawings. The aluminum grate frame shall be manufactured from 0.063" tempered commercial aluminum, consisting of two parallel plates separated by spaces spanning the slot on 6" centers. The grating shall be 1/2 - #13 galvanized steel. The flange at the bottom of the aluminum grate shall be riveted to the pipe with a minimum of two rivets per linear foot. Provide grate with openings compliant with ADA standards when located within sidewalk or other pedestrian walking areas or where specifically indicated on drawings.

- C. Floor Drains: 12-inch diameter top drain, Dura-Coated cast iron body with 6-inch bottom outlet, seepage pan, adjustable extension frame and medium duty slotted grate. Top shall be polished nickel bronze and secured with slotted screws.

- D. Area Drains or Planter Drains: 15-inch square top drain designed to be attached with a watertight connection to vertical HDPE or PVC pipe, ductile iron slotted surface grate, watertight pipe adapters. Grates shall be pedestrian-type where set in pavement or sidewalk. Grates shall be dome-type where set in mulched areas.

2.4 MANHOLES

- A. Precast Concrete Storm Drainage Manholes: ASTM C-478 precast reinforced concrete, eccentric cone. All structures shall be designed to withstand AASHTO H-20 loads.
 - 1. Base, Channel, and Bench: Concrete.
 - 2. Joint: Preformed flexible plastic gaskets complying with Fed. Spec. SS-S-210A.
 - 3. Size: As required to accommodate proposed pipes indicated on the drawings, 4-ft diameter minimum.
- B. Frames and Covers: ASTM A48, Class 35B, heavy-duty cast iron. Include flat, round grate with 1-1/2” wide slotted drainage openings with a minimum total open area of 150-sq.in.

2.5 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
 - 1. Cement: ASTM C 150, Type I, 3,000-psi.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- B. Structures: Portland-cement design mix, 4000 psi minimum, with 0.45 maximum water-cement ratio.
 - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 - 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.

2.6 FOUNDATION DRAIN PIPING

- A. Foundation and Under Slab Drain Pipe and Fittings: ASTM D-1785, SCH 40 PVC with slotted perforations located in bottom half of pipe. Minimum 4-inch diameter unless otherwise indicated on the drawings.
 - 1. Filter Fabric: Non-woven geotextile drainage fabric per Division 31, Section “Earth Moving.”

2.7 STORM PIPE SUB-DRAIN OR SOCK DRAIN PIPING

- A. Storm Pipe Sub-Drain Pipe and Fittings: SCH 40 PVC, with slotted perforations located in bottom half of pipe. Minimum 4-inch diameter unless otherwise indicated on the drawings.
- B. Filter Fabric: Non-woven geotextile drainage fabric per Division 31, Section “Earth Moving.”

2.8 CLEANOUTS

- A. Description: ASME A112.36.2M, round, cast-iron housing with clamping device and round, secured, scoriated, cast-iron cover. Include cast-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:

1. Light Duty: In earth or grass, foot-traffic areas.
2. Medium Duty: In paved, foot-traffic areas.
3. Heavy Duty: In vehicle-traffic service areas.
4. Extra Heavy Duty: In roads.

2.9 HIGH-CAPACITY FRENCH DRAINS

- A. High-Capacity French Drains shall be installed along existing drainage features, locations shown on the plans and as directed by the Owner's independent testing agency. French drains shall consist of a backhoe excavated trench, lined with non-woven geotextile fabric, a 4-in perforated pipe, and backfilled with #57 washed stone.
1. Filter Fabric: Non-woven geotextile drainage fabric per Division 31 Section "Earth Moving." Fabric shall completely encapsulate the washed stone backfill.
 2. Pipe and Fittings: ASTM D-1785, SCH 40 PVC or dual-wall, smooth-lined HDPE with slotted perforations. Minimum 4-inch diameter unless otherwise indicated on the drawings.
 3. Filter Stone: No. 57 washed stone.
 4. Trench: Trench shall be at least 24-inches wide by at least 18-inches deep. The exposed end of the drain shall be covered with fabric and approximately 12-in of Class A riprap to protect the outfall from damage.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 31, Section "Earth Moving."

3.2 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where indicated and where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

3.3 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of underground drainage systems piping. Location and arrangement of piping layout take into account many design considerations. Install piping as indicated, to extent practical.
- B. 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 according to 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.
- C. Use proper size increasers, reducers, and couplings, where different sizes or materials of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- D. Extend drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
- E. Install drainage piping pitched down in direction of flow, at minimum slope of 1 percent and 12-inch minimum cover, except where otherwise indicated.
- F. Polyvinyl Chloride (PVC) Plastic Pipe and Fittings: As follows:

1. Join solvent-cement-joint pipe and fittings with solvent cement according to ASTM D 2855 and ASTM F 402.
 2. Join pipe and gasketed fittings with elastomeric seals according to ASTM D 2321.
 3. Join profile sewer pipe and ribbed drain pipe and gasketed fittings with elastomeric seals according to ASTM D 2321 and manufacturer's written instruction.
 4. Install according to ASTM D 2321.
- G. Install HDPE pipe in accordance with ASTM D2321 with the exception that minimum cover in trafficked areas shall be 12-inches.
1. Slightly scarify and grade the trench base to provide a uniform trench bottom. Before installing pipe, bring bedding material or trench bottom to grade along the entire length of the pipe. For 42" pipe and larger, shallow bell holes shall be provided.
 2. Trench width shall be wide enough to accommodate compaction equipment. Refer the manufacturer's recommendations. Pipe backfill to springline shall be compacted to 95% Standard Proctor density regardless of pipe location.
 3. Excessive groundwater necessitates dewatering. Pipe will float in standing water, requiring immediate haunching and initial backfill to hold line and grade.
 4. Join pipe per manufacturer's instructions. The exposed end of the drain shall be covered with fabric and approximately 12-in of Class A riprap to protect the outfall from damage.
- H. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and fit both systems' materials and dimensions.

3.4 CATCH BASIN/YARD INLET INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.
- C. Install prefabricated area drains per manufacturer's instructions.

3.5 HIGH-CAPACITY FRENCH DRAIN INSTALLATION

- A. Install drains along existing drainage features, locations shown on the plans and other locations as directed by the Owner's independent testing agency.
 1. In fill areas of site, install drain by trenching into existing ground, remove organic material from the bottom of the trench.
 2. In cut areas of site, install drains to provide positive slope and begin at high point with bottom of trench at approximately 48-in below finished subgrade elevation or at least 48-in below the building finish floor, whichever is deeper. Coordinate trench elevations to run beneath new utility lines.
 3. Extend trenches to daylight into existing drainage features. The exposed end of the drain shall be covered with fabric and approximately 12-in of Class A riprap to protect the outfall from damage.
 4. Drains shall be installed as early as possible following installation of down-gradient sediment controls, but at least several weeks before general site grading, to aid in dewatering of the site prior to large scale striping and grading operations.
 5. Drain installation shall be verified and quantified by the Owner's independent testing agency.

3.6 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either of the following procedures:

1. Close open ends of piping with at least 8-inch-thick brick masonry bulkheads.
2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.

B. Abandoned Structures: Excavate around structure as required and use either of the following procedures:

1. Remove structure and close open ends of remaining piping.
2. Backfill to grade according to Division 31, Section "Earth Moving."

3.7 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as the 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 plug in end of incomplete piping at end of day and whenever work stops.
3. Flush piping between manholes and other structures, if required by authorities having jurisdiction, to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of the Project.

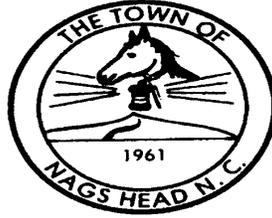
1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visual between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of a ball or cylinder of a size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

C. All HDPE pipe and fittings 12-inch in diameter and greater shall be inspected by the pipe supplier/manufacturer following delivery to the construction site for damage caused during transit. Damaged or defective materials shall be removed from the site. A record of this inspection(s) shall be submitted to the Architect / Engineer. Contractor shall supply documentation of experience in the installation of HDPE storm drainage pipe or shall provide for installation supervision by the supplier/manufacturer.

D. Test new piping systems and parts of existing systems that have been altered, extended, or repaired for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to authorities having jurisdiction.
3. Schedule tests, and their inspections by authorities having jurisdiction, with at least 24 hours' advance notice.
4. Submit separate reports for each test.

END OF SECTION 334000



Town of Nags Head

Post Office Box 99
Nags Head, North Carolina 27959
Telephone (252) 441-5508
Fax (252) 441-0776
www.townofnagshead.net

BID FORM

DOWDY PARK – PHASE ONE DEVELOPMENT

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

**TOWN OF NAGS HEAD
c/o CLIFF OGBURN, TOWN MANAGER
5401 S. CROATAN HWY.
NAGS HEAD, NORTH CAROLINA**

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 120 days after the Bid opening. At the end of the 120-day period, the Bid may be withdrawn at the written request of the Bidder. If the Bid is not withdrawn, it will remain in effect until an award is made or the solicitation for Bids is canceled.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.
- E. As of the date listed in Article 8, the entity listed is not listed on the Final Divestment List created by the State Treasurer pursuant to N.C.G.S. 143-6A-4. The undersigned hereby certifies that he or she is authorized by the entity listed above to make the foregoing statement.

ARTICLE 5 – BASIS OF BID

- 5.01 This project shall be bid, contracted, and paid on a Lump Sum Basis for each project, except as otherwise provided below. The Bid Tabulation Form provided as part of these Contract Documents provides for the following;
- A. A space for the bidder to indicate his Lump Sum Price for the Base Bid in numeric and written form, which shall comprise all the work except for any item(s) which may be expressly listed as an Additive Alternate or Deductive Alternate thereon.
 - B. Space for the bidder to indicate his separate Lump Sum Price for any Additive Alternate(s), which shall be full compensation for the described item(s) of work which the Owner, at his sole discretion, may elect to ADD TO the Base Bid work.
 - C. Space for the bidder to indicate his separate Lump Sum Price for any Deductive Alternate(s), which shall be full value for the described item(s) of work which the Owner, at his sole discretion, may elect to DEDUCT FROM the Base Bid work.
 - D. Space for the bidder to indicate a separate Unit Price for any item(s) of work for which the precise quantity of same cannot be accurately determined in advance, and which the Owner desires to measure and pay for on a unit price basis. A change order shall be initiated, based on the estimated quantities of such work, and a purchase order issued, before any such work is begun. Unit price information shall be utilized to divide portions of the work that will be applied to grant funds received for the project. Note: Bidders shall not consider this as a comprehensive Unit Price item listing and should rely on the plans and specifications to determine quantities in the calculation of the Lump Sum Price.
 - E. Only those spaces provided for entry of the Base Bid, Additive and/or Deductive Alternates (if any), and the Schedule of Values are to be filled in. Bidders may not add in conditions, provisions, or items of their own; doing so will result in disqualification of the bidder.
- 5.02 Owner reserves the right to reject any or all Bids, including without limitation the rights to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder if Owner believes that it would not be in the best interest of Owner to make an award to that Bidder. For comparison purposes alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors, the award may be made to said Successful Bidder on its Base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award and in the interest of the Town of Nags Head:

Item No.	Description	Per Unit	Unit Price
Earthwork & Storm Drainage			
1	Clearing & Grubbing	AC	
2	Import Select Fill (furnished, placed & compacted)	CY	
3	Import Clean Fill (furnished, placed & compacted)	CY	
4	Grading	AC	
5	Erosion & Sediment Control – Silt Fence	LF	
6	Erosion & Sediment Control- Inlet Protection	EA	
7	Infiltration Basin Construction	SY	
8	12" Dia. Slotted Drain Pipe	LF	
9	8" Dia. Storm Pipe (solid)	LF	
10	8" Dia. Storm Pipe (sock drain)	LF	
11	4" Dia. Storm Pipe (normal)	LF	
12	Yard Inlet Structure	EA	
Site Improvements			
13	Paving Subgrade Preparation	SY	
14	Light Duty- Pavement Section	SY	
15	Concrete Curb & Gutter (24" vertical Curb)	LF	
16	Concrete Ribbon (18" Flat)	LF	
17	Pavement Striping	LF	
18	Concrete Curb Stop	EA	
19	Concrete Walkways (Standard Concrete)	SF	
20	Event Plaza (Standard Concrete)	SF	
21	Conduit Installation	LS	
Electrical and Plumbing			
22	Electrical Work (material, labor & Installation)	LS	
23	Plumbing Work (material, labor & installation)	LS	
Site Furnishings			
24	This work will consist of the material, labor and installation of the following, but not limited, site furnishings; art bench, backed bench, backless bench, game table, tables, chairs, fitness signage, (2) fitness stations, "Tornado" shade structures, deck shade structure, arbors, colorful poles, art panels, trash receptacles, loggerhead turtle, nest impressions	(NOT IN CONTRACT)	
Playground Equipment			(NOT IN CONTRACT)
Irrigation and Landscaping			(NOT IN CONTRACT)
Specialties			

Item No.	Description	Per Unit	Unit Price
25	Stamped Concrete (material, labor & Installation)	SY	
26	Stamped Concrete impressions ("turtle feet" & "logs")	LF	
27	Painted games in Concrete Walkway	LS	
28	Concrete Seat /Retaining Wall w/fossil stamping	LS	
29	Concrete Holey Wall	LF	
30	Peek-A-Boo Fence	LS	
31	Natural Play Sand	CY	
32	Perimeter split-rail fence	LF	
33	Chalk Wall	LF	
34	"Chin-Up Bar" Fitness Station	LS	
35	Wood Pylons	EA	
36	Architectural Border Pilings	LF	
37	Picket Fence	LF	

Total of Lump Sum (Base Bid) = Total Base Bid Price \$ _____

Alternates	Description	Amount
1 – Pavilion	Provide the cost to ADD construction of the single-story wood frame structure as described on Architectural Sheets A1.0 through A 4.3 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation. Should the pavilion be omitted from the project scope, the electrical service and lighting control equipment (Panel MDP, lighting contactor, and timeclock) shall be installed on a stainless steel equipment rack in the vicinity of the pad mounted transformer. Refer to the attached "Equipment Rack Detail" for construction of the rack. The main safety switch shall be omitted from the project. All remaining electrical equipment (Panel MDP, lighting contactor, and timeclock) shall be provided with NEMA 4X stainless	

	steel enclosures	
2-Promenade Trellis	Provide the cost to ADD construction of the treated wood trellis and vertical shade screen members as described on Detail Sheet C7.5 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation.	
3- Elevated Wood Walkway	Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Walkway Performance Specification section 061533. See plan sheet C-1.1 for location and detail sheet C-7.6.	
4- Elevated Wood Deck/Stairs	Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Deck Performance Specification section 061533. See plan sheet C-1.1 for location. The shade structure and supporting framing shall be performed by others	
5-Brick Pavers	Provide the cost to ADD the materials and labor for the installation of brick paver border specified in the Event Plaza. Refer to Specification Section 321313-Concrete Paving and Specification section 321416 Unit Pavers. See plan sheet C-1.1 for location and detail sheet C-7.3 for Picture Frame Finish and Concrete Unit Paver Details.	
6-Concrete Walkways	Provide a DEDUCT cost based upon the following reduced typical concrete walkway widths; <ul style="list-style-type: none"> • 15 ft. continuous sidewalk width reduced to 12 ft. in total width, • 10 ft. continuous sidewalk width reduced to 8 ft. in total width, • 6 ft. continuous sidewalk width reduced to 5 ft. in total width. 	

		This cost shall include furnishing of materials and labor for the installation of concrete walkways. Refer to Specification Section 321313- Concrete Paving. See plan sheet C-1.1 for location and detail sheet C-7.3 for Concrete Walkway Picture Frame Finish.	
7-Parking Lighting	Lot	Provide the cost to ADD materials, labor and installation of Parking Lot Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.	
8-Bollard Pathway Lighting		Provide the cost to ADD materials, labor and installation of Bollard Pathway Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.	
Total Amount: Base Bid w/ Alternates			

5.03 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Division 1 Specification Sections and General and Supplementary Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

ARTICLE 6 – ATTACHMENTS TO THIS BID

6.01 The following documents are submitted with and made a condition of this Bid:

- A. List of Proposed Subcontractors;
- B. List of Proposed Suppliers;
- C. List of Project References;
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
- E. Contractor's License No.: _____ [or] Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;

ARTICLE 7 – DEFINED TERMS

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, Division 1 Specification Sections, the General Conditions, and the Supplementary Conditions.

ARTICLE 8 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

Bidder's License No.: _____
(where applicable)

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum

\$

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

(Seal)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By:

Signature

By:

Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest:

Signature

Attest:

Signature

Title

Title

Note: Addresses are to be used for giving any required notice.

Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

NONDISCRIMINATION CLAUSE (Attach to Bid)

It is specifically agreed as part of the consideration of the signing of the Contract that the parties hereto, their agents, officials, employees or servants will not discriminate on any basis prohibited by applicable Federal or State Law. The parties hereto further agree in all respects to conform to the provisions and intent of the Town of Nags Head, North Carolina Ordinance.

This provision being incorporated for the benefit of the Town of Nags Head and its residents may be enforced as set out in said ordinances, enforcement of this provision shall be by action for specific performance, injunctive relief, or other remedy as by law provided.

This provision shall be binding on the successors and assigns of the parties hereto with reference to the subject matter of this Contract.

(Use the following form for signatures by a CORPORATION):

Corporate Name

ATTEST:

(Assistant) Secretary

BY: _____
(Vice) President

(Printed Name)

(Printed Name)

(Corporate Seal)

(Use the following form for signatures by an INDIVIDUAL):

BY: _____ (SEAL)

(Printed Name)

WITNESS:

(Printed Name)

MINIMUM MINORITY BUSINESS COMPLIANCE REQUIREMENTS:

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

In determining whether a contractor has made Good Faith Efforts, the Town will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and result of these efforts. Good Faith Efforts include:

- (1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on the Town or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.
- (2) Making the construction plans, specifications, and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.
- (3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.
- (4) Working with minority trade, community, or contractor organizations identified by the Office for Business Assistance Program and included in the bid documents that provide assistance in recruitment of minority businesses.
- (5) Attending any prebid meetings scheduled by the public owner.
- (6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.
- (7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- (8) (Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- (9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- (10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash flow demands.

AFFIDAVIT A-Listing in Good Faith Effort (Attach to Bid)

County of _____

Affidavit of _____

(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:
(A minimum of 50 points must be obtained in order to have achieved a "good faith effort")

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

2-Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due. Value=10 points.

3-Broken down or combined elements of work into economically feasible units to facilitate minority participation. Value = 15 points.

4-Worked with minority trade, community, or contractor organizations identified by the Office of Business Assistance Program and included in the bid documents that provide assistance in recruitment of minority businesses. Value=10 points.

5-Attended prebid meetings schedule by the public owner. Value=10 points.

6-Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors. Value=20 points.

7-Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing. Value =15 points.

8-Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit. Value=25 points.

9-Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible. Value =20 points.

10-Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash flow demands. Value=20 points.

TOTAL POINTS OBTAINED _____ .

In accordance with GS143-128.2 (d) the undersigned will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by this statutory provision will constitute a breach of the contract. The undersigned hereby certifies that the or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____

State of North Carolina, County of _____

Subscribed and sworn to before me this _____ day of _____ 20__

SEAL

Notary Public _____ My commission expires _____

AFFIDAVIT B- Intent to Perform Contract with Own Workforce (Attach to Bid)

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100 % of the work required for the _____
_____ contract.
(Name of Project)

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

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

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

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

Seal

State of North Carolina, County of _____

Subscribed and sworn before me this _____ day of _____ 20__

Notary Public _____

My commission expires _____

AFFIDAVIT C- Portion of the Work to be Performed by Minority Firms

County of _____

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

If the portion of the work to be executed by minority businesses as defined in GS 143-128.2 (g) is equal to or greater than 10 % of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder

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

 (Project Name)

Project ID # _____ Amount of Bid \$ _____

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

Attach additional sheets if required

Name and Phone Number	*Minority category	Work Description	Dollar Value

*Minority categories: Black, African American, (B), Hispanic (H), Asian American (A), American Indian (I), Female (F)

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

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

Date: _____ Name of Authorized Officer: _____
 Signature: _____
 Title: _____

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

SEAL

AFFIDAVIT D-Good Faith Efforts

County of _____

If the goal of 10 % participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his Good Faith Efforts:

(Name of Bidder)

Affidavit of _____

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

(Attach additional sheets if required)

Name and Phone Number	Minority Category	Work Description	Dollar Value

*Minority categories: Black, African American, (B), Hispanic (H), Asian American (A), American Indian (I), Female (F)

Documentation of the Bidder’s good faith efforts to meet the goals set forth in these provisions. Examples of documentation include, but are not limited to, the following evidence:

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

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

Date: _____ Name of Authorized Officer: _____
 Signature: _____
 Title: _____

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

SEAL

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

Prepared by



Issued and Published Jointly by



AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Town of Nags Head (“Owner”) and
_____ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: *Construction of a new multi-purpose building, a new parking lot, paved walkways, landscaping, associated plumbing and electrical development, new site lighting and related site and infrastructure improvements.*

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Dowdy Park – Phase One Site Development

ARTICLE 3 – ENGINEER/ARCHITECT

- 3.01 The part of the Project that pertains to the Work has been designed by CLH Design, PA 400 Regency Forest Dr., Suite 120, Cary, NC 27518, Nags Head Public Works, P.O. Box 99, Nags Head, NC 27959, Pace Collaborative, 1277 Perimeter Parkway, Virginia Beach, VA and Cahoon + Kasten Architects, 118 W. Woodhill Dr., Nags Head, NC 27959.
- 3.02 The Owner has retained CLH Design, PA, David M. Ryan, P.E., Pace Collaborative and Cahoon + Kasten Architects (“Engineer/Architect”) to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

- 4.01 *Time of the Essence*
- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 4.02 *Contract Times: Dates*
- A. The Work will be substantially completed on or before December 31, 2016, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before January 31, 2016.
- B. Parts of the Work shall be substantially completed on or before the following Milestone(s):
1. **Milestone 1** [October 3, 2016] Finished Grade for Playground Elements

4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):
1. Substantial Completion: Contractor shall pay Owner \$ 500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
 2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner \$ 250 for each day that expires after such time until the Work is completed and ready for final payment.
 3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.
 4. Milestones: Contractor shall pay Owner \$ 250 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:
- A. For all Work, including ADD Alternates, as authorized by the Town of Nags Head, a lump sum of: \$.
- All specific cash allowances are included in the above price in accordance with the General Conditions.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with the General Conditions. Applications for Payment will be processed by Engineer/Architect as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 10th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of

Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract
 - a. 100 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
 - b. 20 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer/Architect as provided in said General Conditions.

ARTICLE 7 – INTEREST

- 7.01 All amounts not paid when due shall bear interest at the rate of 1% percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:
- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
 - B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of

construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

- E. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- F. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- G. Contractor has given Engineer/Architect written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- H. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- I. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages 1 to 10, inclusive).
 - 2. Performance bond (pages 1 to 3, inclusive).
 - 3. Payment bond (pages 1 to 3, inclusive).
 - 4. Other bonds.
 - a. Bid Bond (pages 1 to 2, inclusive).
 - 5. General Conditions (pages 1 to 17, inclusive).
 - 6. Supplementary Conditions (pages 1 to 10, inclusive).
 - 7. Specifications as listed in the table of contents of the Project Manual.
 - 8. Drawings (not attached but incorporated by reference) consisting of 29 sheets with each sheet bearing the following general title: Dowdy Park – Phase 1 Site Development Plan.
 - 9. Addenda (numbers to , inclusive).
 - 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages 1 to 10, inclusive).
 - b. Nondiscrimination Clause (pages 1 to 1, inclusive).
 - c. Identification of Minority Business Participation (pages 1 to 1, inclusive).
 - d. Affidavit A- Listing in Good Faith Effort (pages 1 to 1, inclusive).
 - e. Affidavit B- Intent to Perform Contract with Own Workforce (pages 1 to 1, inclusive).

- f. Affidavit D – Good Faith Efforts (pages 1 to 1, inclusive).
 - g. Phase I & Phase II Environmental Assessment as prepared by Quible & Associates, PC dated July 2007, (to be made available upon request)
 - h. Report of Subsurface Investigation and Geotechnical Engineering Services as prepared by GET Solutions, Inc. dated March 31, 2016, (to be made available upon request)
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
- a. Notice to Proceed.
 - b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 Terms

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

- A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

- A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Town of Nags Head Provisions*

- A. *Performance of Government Functions.* Nothing contained in this Agreement shall be deemed or construed so as to in any way estop, limit, or impair the Town from exercising or performing any regulatory, policing, legislative, governmental, or other powers or functions.
- B. *Independent Contractor.* Both the Owner and Contractor and its subcontractors, if any, agree that the Contractor and its subcontractors, if any, shall act as an independent contractor and shall not represent itself as an agent or employee of the Town for any purpose in the performance of the Engineer's duties under this Agreement. Accordingly, the Engineer shall be responsible for payment of all Federal, State, and local taxes arising out of the Engineer's and sub consultants, as applicable, activities in accordance with this Agreement, including by way of illustration but not limitation, Federal and State income tax, Social Security tax, Unemployment Insurance taxes, and any other taxes or business license fees as required.
- C. *Insurance and Indemnity.* The Contractor and its subcontractors, if any, shall indemnify and save harmless the Town, its agents and employees from and against all actions, liability, claims, suits, damages, cost or expenses of any kind which may be brought or made against the Town or which the Town must pay and incur by reason of or in any manner resulting from injury, loss or damage to persons or property resulting from negligent performance of or failure to perform any of its obligations under the terms of this Agreement.
1. The Contractor and its subcontractors, if any, shall be fully responsible to the Town for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by it, as the Engineer is for the acts and omissions of persons directly employed by it.
 2. The Contractor and its subcontractors, if any, shall comply with the North Carolina Worker's Compensation Act and shall provide for the payment of workers' compensation to its employees in the manner and to the extent required by such Act. In the event the Contractor and subcontractors, if any, are excluded from the requirements of such Act and does not voluntarily carry workers' compensation coverage, the Contractor shall carry or cause its

employees to carry adequate medical/accident insurance to cover any injuries sustained by its employees or agents during the performance of Services and in accordance with the limits specified in the General Conditions.

3. The Contractor and its subcontractors, if any, agrees to furnish the Town proof of compliance with said Act or adequate medical/accident insurance coverage upon request and in accordance with the limits specified in the General Conditions.
 1. The Contractor and its subcontractors, if any, upon request by the Town shall furnish a Certificate of Insurance from an insurance company, licensed to do business in the State of North Carolina and acceptable to the Town verifying the existence of any insurance coverage required by the Town and in accordance with the limits specified in the General Conditions. The Certificate will provide for sixty (60) days advance notice in the event of termination, reduction, or cancellation of coverage.
- D. *Health and Safety.* The Contractor and its subcontractors, if any, shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The Contractor and its subcontractors, if any, shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees from the work and other persons who may be affected thereby.
- E. *Non-Discrimination in Employment.* The Contractor or its subcontractors, if any, shall not discriminate on any basis prohibited by applicable Federal or State Law against any employee or applicant for employment. The Contractor or its subcontractors, if any, shall take affirmative action to ensure that applicants are employed and that employees are treated during employment in accordance with applicable Federal or State Law. In the event the Contractor or its subcontractors, if any, is determined by the final order of an appropriate agency or court to be in violation of any non-discrimination provision of federal, state or local law or this provision, this Agreement may be cancelled, terminated or suspended in whole or in part by the Town, and the Contractor may be declared ineligible for further contracts.
- F. *E-Verification of Employees:* The Engineer represents and warrants that it has ensured and will ensure for itself and each subcontractor that it uses to perform obligations under this Agreement, that either:
1. The Engineer or subcontractor employs less than 25 employees; or
 2. The Engineer or subcontractor: (a) employs 25 or more employees who are employed for 9 months or more during a 12-consecutive-month period; and (b) has used the E-Verify program, which program is operated by the United States Department of Homeland Security and is defined in N.C. Gen. Stat. § 64-25 (5), to verify the work authorization of each employee.
- G. *Other Provisions.* This Agreement is subject to such additional provisions as are set forth in any addendum executed separately by each party and attached hereto.
1. *Contract Documents/Amendments.* This document together with the purchase order, as applicable, and any incorporated exhibits constitutes the entire Agreement between the said two parties and may only be modified by a written mutual agreement signed by the parties and attached hereto. In the event of any conflict between this Agreement and any attached documents, the Agreement language will prevail.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

License No.: _____

(where applicable)

“This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act.”

Finance Officer

APPROVED AS TO FORM AND LEGAL SUFFICIENCY.

TOWN ATTORNEY

PERFORMANCE BOND

CONTRACTOR *(name and address):*

SURETY *(name and address of principal place of business):*

OWNER *(name and address):*

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location):*

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract):*

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal *(seal)*

Surety's Name and Corporate Seal *(seal)*

By: _____
Signature

By: _____
Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence,

to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims

for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: None See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

_____ *(seal)*

Contractor's Name and Corporate Seal

_____ *(seal)*

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Signature

Attest: _____

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. **Definitions**
 - 16.1 **Claim:** A written statement by the Claimant including at a minimum:
 1. The name of the Claimant;
 2. The name of the person for whom the labor was done, or materials or equipment furnished;
 3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 4. A brief description of the labor, materials, or equipment furnished;
 5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 7. The total amount of previous payments received by the Claimant; and
 - 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
 - 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
 - 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
 - 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.



Department of Public Works

Administration
Maintenance Garage
Public Facilities Maintenance
Sanitation
Water Distribution
Water Operations

Town of Nags Head

Post Office Box 99
Nags Head, North Carolina 27959
Telephone 252-441-1122
Fax 252-441-3350
www.nagsheadnc.gov

Ralph Barile
Public Works Director

David Ryan, P.E.
Project Coordinator

ADDENDUM NO. 1

Date: June 22, 2016

RE: **Request for Proposal for Dowdy Park – Phase One Development (Base Bid)**

FROM: Town of Nags Head – Department of Public Works
2200 Lark Ave.
Nags Head, NC 27959

TO: Prospective Proposers

This addendum forms a part of the Contract Documents modifying the original June 2, 2016 Request for Proposals for the Town of Nags Head Dowdy Park – Phase One Development (Base Bid) as noted below. Please acknowledge receipt of this Addendum by denoting on page 1 of the Bid Form. Failure to do so may subject the bidder to disqualification.

This Addendum consists of the following amendments to the following;

1. Project Manual -Division 1- Section 011000 – Summary (Replace 011000-2 & 011000-3)
 1. Section 1.3 (G)(b)(2) ADDED *and site furnishing contractor(s) at end of sentence.*
 2. Section 1.3 (G)(b)(6) ADDED *The main base bid package will not include the purchase and installation of typical site furnishings, (i.e. art bench, backed bench, backless bench, game table, tables, chairs, fitness signage, (2) fitness stations, “Tornado” shade structures, deck shade structure, arbors, colorful poles, art panels, trash receptacles, loggerhead turtle, nest impressions, etc.)*

2. Project Manual -Division 1- Section 012300 – Alternates (Replace Section)

Amended Section 3.1 of the Schedule of Alternates with the following;

Alternate No. 1. Pavilion

Provide the cost to ADD construction of the single-story wood frame structure as described on Architectural Sheets A1.0 through A 4.3 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation. Should the pavilion be omitted from the project scope, the electrical service and lighting control equipment (Panel MDP, lighting contactor, and timeclock) shall be installed on a stainless steel equipment rack in the vicinity of the pad mounted transformer. Refer to the attached “Equipment Rack Detail” for construction of the rack, (includes a graphic detail at the End of the Section). The main safety switch shall be omitted from the project. All remaining electrical equipment (Panel MDP, lighting contactor, and timeclock) shall be provided with NEMA 4X stainless steel enclosures.

Alternate No. 2 Promenade Trellis

Provide the cost to ADD construction of the treated wood trellis and vertical shade screen members as described on Detail Sheet C7.5 and site location on plan sheet C-1.1. ADD cost shall include material price, labor for fabrication and installation.

Alternate No.3. Elevated Wood Walkway

Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Walkway Performance Specification section 061533. See plan sheet C-1.1 for location and detail sheet C-7.6.

Alternate No. 4. Elevated Wood Deck/Stairs

Provide the cost to ADD the design, permitting, materials and labor for the construction of an elevated wood walkway in accordance with the North Carolina Building Code, current edition. Refer to the Elevated Wood Deck Performance Specification section 061533. See plan sheet C-1.1 for location. The shade structure and supporting framing shall be performed by others.

Alternate No. 5. Brick Pavers

Provide the cost to ADD the materials and labor for the installation of brick paver border specified in the Event Plaza. Refer to Specification Section 321313- Concrete Paving and Specification section 321416 Unit Pavers. See plan sheet C-1.1 for location and detail sheet C-7.3 for Picture Frame Finish and Concrete Unit Paver Details.

Alternate No. 6. Concrete Walkways

Provide a DEDUCT cost based upon the following reduced typical concrete walkway widths;

- 15 ft. continuous sidewalk width reduced to 12 ft. in total width,
- 10 ft. continuous sidewalk width reduced to 8 ft. in total width,
- 6 ft. continuous sidewalk width reduced to 5 ft. in total width.

This cost shall include furnishing of materials and labor for the installation of concrete walkways. Refer to Specification Section 321313- Concrete Paving. See plan sheet C-1.1 for location and detail sheet C-7.3 for Concrete Walkway Picture Frame Finish.

Alternate No.7. Parking Lot Lighting

Provide the cost to ADD materials, labor and installation of Parking Lot Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.

Alternate No.8. Bollard Pathway Lighting

Provide the cost to ADD materials, labor and installation of Bollard Pathway Lighting for the delineated locations shown on plan Sheet E1.0 and Detail Sheet E0.3.

3. Project Manual -Forms – Bid Form (Replace Bid Form Sheets 3 through End)

1. Article 5.01.A: DELETED or Unit Price Work at end of sentence.
2. Article 5.01.D: ADDED Note: Bidders shall not consider this as a comprehensive Unit Price item listing and should rely on the plans and specifications to determine quantities in the calculation of the Lump Sum Price.

3. Article 5.02: Unit Price Table

- a. REPLACED Line Item 21- *Pavilion Construction with Conduit Installation*
- b. DELETED following language from Line Item 22- *Excluding Bollards & Associated Work.*
- c. ADDED following language to Line Item 24 - *(2) fitness stations, "Tornado" shade structures, arbors, colorful poles, art panels, trash receptacles, loggerhead turtle, nest impressions.*
- d. REPLACED Line Item 26- *Concrete Unit paver with Stamped Concrete Impressions*
- e. REPLACED Line Item 31- *Shade Structure with Natural Play Sand*
- f. REPLACED Line Item 32- *Arbor Entry with Perimeter Split rail fence*
- g. REVISED Line Item 34- *From Fitness Equipment to "Chin-Up Bar" Station*
- h. ADDED Line Item 37- *Picket Fence*
- i. REVISED Alternate Table in accordance with Project Manual -Division 1- Section 012300 – Alternates, Section 3.1 of the Schedule of Alternates, (See #2 above for reference)

4. Dowdy Park Phase 1 – Plan Set

Sheet C1.1 Staking and Pavement Marking Plan (Replace Sheet C1.1)

1. The following Key Note Items have been labeled as "Not in Contract"
 - a. *Key Note G: Art Bench*
 - b. *Key Note H: Bench*
 - c. *Key Note N: Table*
 - d. *Key Note P: Game Table*
 - e. *Key Note Z: Deck Structures*
 - f. *Key Note AA: Adirondack Chairs*
 - g. *Key Note LL: Bicycle Racks*
 - h. *Key Note NN: Trash Receptacles w/concrete pad (Receptacle only)*
2. The following Key Note Items are listed as Alternates
 - a. *Key Note: E: Concrete Sidewalk (Alt. #6)*
 - b. *Key Note L: Promenade Trellis (Alt. #2)*
 - c. *Key Note M: Pavers (Alt. #5)*
 - d. *Key Note Y: Observation Deck (Alt. #4)*
 - e. *Key Note MM: Pavilion (Alt. #1)*

Sheet C3.0 Grading, Drainage and Conduit Plan (Replace Sheet C3.0)

1. REMOVED *(1) 4" dia. conduit located in Event Plaza located to NW of Pavilion*
2. EXTENDED *(2) 4" dia. conduits located in center portion of Event Plaza northward to parking lot landscape island.*
3. REMOVED *(1) 4" dia. conduit located in SW corner of parking lot.*
4. REPLACED *(1) 4" dia. conduit with a 2" dia. conduit located immediately south of Poured in Place Dune #1.*

Sheet C7.3 Site Details (Replace Sheet C7.3)

5. *Picture Frame Finish for Concrete Sidewalk Detail – ADDED designation Alt #5*
6. *Play Area Safety Surfaces Detail*
 - a. *REVISED- Depth of Subgrade elevation from 7-in below to 13-in below finished grade. Applies to ALL Play Area Safety Surface Sections.*

Sheet C7.5 Site Details (Replace Sheet C7.5)

1. *Promenade Trellis Detail – ADDED designation Alt #2*

Sheet C7.6 Site Details (Replace Sheet C7.6)

1. Deck Shade Structures Detail – ADDED designation *Not in Contract*
2. Art Bench-Type 1- ADDED designation *Not in Contract*
3. Art Bench-Type 2- ADDED designation *Not in Contract*

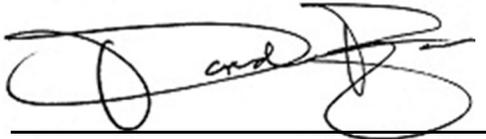
Sheet E1.0 Electrical Site Plan (Replace Sheet E1.0)

4. REMOVED *Parking Lot Lighting from Base Bid and designated as Alternate #7 .*
5. REVISED *Bollard Pathway Lighting from Alternate #4 designation to Alternate #8 designation.*

Temporary Seeding: shall be a requirement of the Base Bid scope of work and in accordance with the Temporary Seeding Table as described on Sheet C 2.0 Existing Conditions Plan/ Erosion and Sediment Control Plan.

Planholders are responsible for replacing the individual Project Manual and Plan Set Sheet information with the revised information described above. The Project Manual and Bid Plan set will be amended with the updated information and included in the Project Manual and Bid Plan Set and available for download from the Town of Nags Head Website at www.nagsheadnc.gov.

Signed:

A handwritten signature in black ink, appearing to read "D. Ryan", written over a horizontal line.

David M. Ryan, P.E.
Project Coordinator
Town of Nags Head – Department of Public Works

END OF ADDENDUM