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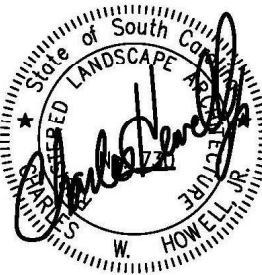
ITB #4-23/24
Westend Park Improvements
City of Sumter
Sumter, South Carolina

Construction Specifications

Proposal For:

S. C. File Number:

Project Number: 1164



Set #

Released for Bid
May 2024

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PROJECT: Westend Park Improvements– ITB#4-23/24

OWNER: City of Sumter
PO Box 1449
21 N Main Street
Sumter, SC 29150

RECEIPT OF BIDS: Separate sealed bids for the construction of the above referenced project will be received by the Owner at their office, by **Tuesday, May 28, 2024 @ 2:00 p.m.** local time, at place of bidding, City of Sumter, located at, 21 N. Main Street, Sumter, SC 29150, and at said location will be publicly opened and read aloud. No bid may be withdrawn within a period of ninety (90) days to allow time for Bid review, qualification of Bidder, and approval of award from funding agencies

PROJECT DESCRIPTION: The project consists of the demolition and installation of asphalt parking lot, sidewalk, restroom/ pavilion, playground, Lighting, Signage, brick columns, fencing, landscaping, irrigation and coordination with Duke Energy, at 320 Oakland Street at the prior Good Samaritan House. Prior experience, qualifications and product certification will be required. This project will be funded by the City of Sumter.

PRE-BID MEETING: A **Mandatory Pre-bid** meeting will be held at the City of Sumter, located at, 21 N. Main Street, Sumter, SC 29150, on **Wednesday, May 15, 2024 @ 2:00pm**. The purpose of such meeting will be to review this project and to answer any questions regarding the project. Any Contractor that does not attend the pre-bid will be disqualified.

QUESTIONS:

All questions regarding this Project should be submitted to:
Kimberly Brown, The LandPlan Group South, admin@landplansouth.com

Bid related questions will be accepted through **Wednesday, May 23, 2024 @ 5:00 p.m.**
The answers to all questions asked will be shared with all participants in the Bid process.

DOCUMENTS AVAILABLE: A non-refundable deposit of \$100.00 will be required to obtain a copy of Contract Documents, which can be requested from The LandPlan Group South, 1206 Scott Street, Columbia, SC 29201. Phone (803) 256-0562.

Documents may be obtained in pdf format without cost. For a link to download, please email a request to admin@landplansouth.com

(End of Section 01105)

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SECTION 01110 SC INFORMATION FOR BIDDERS

1. RECEIPT AND OPENING OF BIDS: Bids will be received at the time and place as specified in the Advertisement for Bids, and then at said office publicly opened and read aloud.

2. LICENSES:

2.1. The attention of Bidders is directed to the provisions of the acts for licensing of General Contractors for the State of South Carolina and all requirements of such acts which have bearing upon this work shall be deemed a part of the Specifications as if written therein in full. The showing by the Contractor of his license number shall be deemed as the Contractor's representation that he is legally qualified to enter into the prescribed Contract for any/or all portions of the work included in his Bid.

2.2. All Bidders submitting a Bid shall have a currently valid "Contractor's License" and a "Bidder's License" for the State of South Carolina. These license numbers shall be shown on the bid form immediately below the signature identification and on the face of the sealed envelope containing the submitted Bid.

2.3. The successful Bidder will be required to obtain a business license from the City of Sumter prior to beginning work, if said Bidder does not have a current license.

2.4. Subcontractors who will be engaged by the General Contractor shall also hold the required licenses.

3. BID SECURITY:

3.1. Each Bid must be accompanied by a certified check of the Bidder, or a Bid Bond duly executed by the Bidder as principal and having as surety thereon a surety company qualified to do business under the laws of the State of South Carolina and satisfactory to the Owner, in an amount not less than five (5) percent of the Bid.

3.2. Such check or Bid Bond will be returned to all except the three (3) lowest Bidders within three (3) days after the opening of Bids, and the remaining checks or Bid Bonds will be returned promptly after the Owner and the accepted Bidder have executed the Agreement, or, if no award has been made within ninety (90) calendar days after the date of the opening of Bids, upon demand of the Bidder at any time thereafter, so long as he has not been notified of the acceptance of his Bid.

4. GUARANTY BONDS:

4.1. The Bidder to whom the contract is awarded will be required to execute the Agreement and obtain the Performance Bond and Payment Bond, each in the sum of the full amount of the Contract Price, within ten (10) calendar days from the date when Notice of Award is delivered to the Bidder.

4.2. The Bonds must be duly executed and acknowledged by the Bidder as principal and by a corporate surety company qualified to do business under the laws of the State of South Carolina and satisfactory to the Owner as surety, for the faithful performance of the Contract and payment for labor and materials. The premiums for such Bonds shall be paid by the Contractor.

4.3. Each Bond must be valid for one year beyond the date of final acceptance of the project.

5. EXECUTION OF CONTRACT: The Owner, within ten (10) calendar days of receipt of acceptable Performance Bond, Payment Bond, and Agreement signed by the party to whom the Agreement was awarded, shall sign the Agreement and return to such party an executed duplicate of the Agreement. Should the Owner not execute the Agreement within such period, the Bidder may by written notice withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

6. POWER OF ATTORNEY FOR BONDS: Attorneys-in-fact who sign Bid Bonds or Performance Bonds or Payment Bonds must file with each Bond a certified and effective dated copy of their power of attorney.

7. LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT: The successful Bidder, upon his failure or refusal to execute and deliver the Contract and Bonds required within ten (10) calendar days after he has received notice of the acceptance of his Bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his bid.

8. LAWS AND REGULATIONS: All applicable laws, 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 as though herein written out in full.

9. NON-RESIDENT CONTRACTORS:

9.1. A Bidder, who is a non-resident contractor, shall be aware of Section 12-9-310, Article 3, of the South Carolina Income Tax Act of 1926, as amended. This article requires the Owner entering into a contract with a non-resident taxpayer, where such contract exceeds ten thousand dollars (\$10,000), to withhold two percent (2%) of each payment made to the non-resident.

9.2. The funds deducted from the payment made to the non-resident contractor are funds deemed to be held in trust for the State of South Carolina and will be reported by the Owner to the South Carolina Tax Commission. This Deduction is in addition to the retainage deductions specified in the General Conditions.

9.3. Modifications to the South Carolina Income Tax Act made January 1, 1993, allow a non-resident contractor to apply for an exemption or partial exemption from the two percent (2%) withholding rule. The non-resident contractor must complete a "Nonresident Taxpayer Request for Exemption Affidavit" (Form WH 303), "Nonresident Taxpayer Affidavit" (Form WH 302) and a subcontractors list. The South Carolina Tax Commission will make the determination and notify both contracting parties of the qualified exempt or partially exempt contracts.

9.4. All contracts for \$ 10,000.00 or more with non-residents which do not qualify for exemption will require the withholding of two percent (2%) from each payment as described above. The non-resident contractor may elect to post a surety bond with the South Carolina Tax Commission to eliminate this withholding requirement. The non-resident must complete and submit the Bond (Form L-2074) and a "Nonresident Taxpayer Affidavit" (Form WH 302) to the South Carolina Tax Commission for review and approval. The Owner must receive verification from the South Carolina Tax Commission if this deduction is to be waived.

9.5. The above referenced forms may be obtained from the South Carolina Tax Commission located at 301 Gervais Street, Columbia, South Carolina (mailing address - P.O. Box 125, Columbia, South Carolina 29214).

10. EXAMINATION OF DRAWINGS AND SPECIFICATIONS: Each Bidder shall carefully examine Drawings and Specifications and all Addenda or other revisions thereto and thoroughly familiarize himself with the detailed requirements thereof prior to submitting a Bid. If any Bidder is in doubt as to the true meaning of any part of the Drawings, Specifications, or other Documents, or if any error, discrepancy, conflict, or omission is noted, the Bidder should immediately contact the Engineer in writing and request clarification. The Engineer will clarify the intent of the Documents and/or correct such error, discrepancy, conflict, or omission, and will notify all Bidders by Addendum in cases where the extent of work or the cost thereof will be appreciably affected. No allowance will be made after Bids are received for oversight by a Bidder.

11. EXAMINATION OF SITE: Each Bidder shall visit the site of proposed work and fully acquaint himself with conditions relating to construction and labor so he may fully understand facilities, difficulties, and restrictions attending execution of work under contract. By executing the Agreement, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the work is to be performed, and correlated his observations with the requirements of the Contract Documents.

12. SUBSURFACE CONDITIONS: Any holder of Construction Documents will be permitted to make test boring, test pits or soundings on the site of the work if he so desires, subject to approval by the owner. The responsibility of all risks and liabilities contingent thereto shall be assumed by the party or parties receiving such approval.

Any boring information which may have been obtained by the owner in the vicinity of the work site of the project is shown in the contract drawings or other contract documents. Such boring information if shown is available to bidder, contractors and other interested parties only as a convenience, and is made available without express or implied representation, assurance or guarantee that the information is adequate, complete or correct or that it represents a true complete picture of the subsurface conditions to be encountered.

It shall be the contractor's obligation to satisfy himself as to the nature, character, quality and quantity of subsurface conditions likely to be encountered. The contractor agrees that he shall neither have nor assert against the owner or engineer, any claim for damages for extra work or relief from any obligation of this contract based upon the boring information made available or based upon the owner to furnish additional boring information.

13. INFORMATION NOT GUARANTEED:

13.1. All information given on the Drawings or in the Contract Documents relating to subsurface conditions, existing structures, location of utilities, sewer inverts, or other information on existing facilities, is from the best sources at present available to the Owner. All such information is furnished only for the information and convenience of the Bidders.

13.2. It is agreed and understood that the Owner does not warrant or guarantee that the conditions, pipes, or other structures encountered during construction will be the same as those indicated on the Drawings or in the Contract Documents. The Bidder must satisfy himself regarding the character, quantities, and conditions of the various materials and the work to be done.

13.3. It further is agreed and understood that the Bidder or the Contractor will not use any of the information made available to him or obtained in any examination made by him in any manner as a basis or ground of claim or demand of any nature, against the Owner or the Engineer, arising from or by reason of any variance which may exist between the information offered by the actual materials or structures encountered during the construction work, except as may otherwise be provided for in the Contract Documents.

13.4. If any work is performed by the Contractor, or any subcontractor, prior to adequate verification of applicable data, any resultant extra cost for adjustment of work necessary to conform to existing conditions, or damage to existing facilities, shall be assumed by the Contractor without reimbursement or compensation by the Owner.

14. COMPLETE WORK REQUIRED:

14.1. The Drawings, Specifications, and all supplementary documents are essential parts of the Contract, and requirements occurring in one are as binding as though occurring in all. They are intended to be cooperative, to describe and provide for a complete work. In case of discrepancy on the Drawings, figured dimensions shall govern. In case of omissions from the Specifications as to items of equipment and materials or quantities therefor, the Drawings shall govern.

14.2. It shall be the responsibility of the Bidder to call to the attention of the Engineer obvious omissions of such magnitude as to affect the strength, adequacy, function, completeness, or cost of any part of the work in ample time for amendment by Addendum prior to letting date.

15. ADDENDA AND INTERPRETATIONS:

15.1. No interpretation of the meaning of the Drawings, Specifications, or other Bid Documents will be made orally to any Bidder by the Engineers prior to award of the contract.

15.2. Every request for such interpretation should be in writing addressed to The LandPlan Group South, 1206 Scott Street, Columbia, SC 29201. To be given consideration, such request

must be received at least seven (7) days prior to the date fixed for the opening of Bids. Any and all such interpretation and any supplemental instruction will be made in the form of written Addenda to the Specifications.

15.3. Addenda will be mailed or delivered to all who are known to have received a complete set of Bidding Documents.

15.4. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

15.5. Every attempt will be made to issue addenda no later than four (4) days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids. Should Addenda be required closer to the bid date than the specified four (4) days, Bidders shall be notified via fax or telephone that an Addendum is being released. Bidders shall be responsible for making necessary arrangements to obtain late-issue Addenda. If an Addendum is technical in nature, no attempt shall be made to provide the changes verbally.

16. ABILITY AND EXPERIENCE OF BIDDER:

16.1. It is the purpose of the Owner not to award this Contract to any Bidder who does not furnish satisfactory evidence that he has the experience of successfully completing projects of this type and magnitude and that he has sufficient capital, equipment, plant, and personnel to enable him to prosecute the work successfully and to complete it in the time named.

16.2. The Owner may make such investigation as it deems necessary to determine the ability of the Bidder to perform the work, and the Bidder shall furnish to the Owner, under oath if so required, all such information and data for this purpose as the Owner may request.

16.3. The successful Bidder will be required to construct the work with his own directly employed personnel to an extent not less than fifty percent (50%) of the Contract Amount.

17. BIDS AND QUALIFICATIONS: Before a Bid is considered for award, the Bidder may be requested by the Engineer to submit a statement of facts in detail as to his previous experience in performing similar or comparable work, and of his business and technical organization and financial resources and plant available to be used in performing the contemplated work.

18. TIME FOR COMPLETION: The Bidder must agree to commence work within the time stipulated in the Agreement. The Bidder also must agree to fully complete the project within the time stipulated in the Agreement.

19. LIQUIDATED DAMAGES: The Bidder must agree to pay as liquidated damages the amount set forth in the Agreement for each consecutive calendar day that the work is incomplete after the date of completion.

20. MODIFICATION OF BIDS: Bids may be modified in writing, executed (in the manner that a bid must be executed) and delivered to the place where bids are to be submitted at any time prior to the opening of bids. Telegraphic modifications of the BID will not be allowed.

21. WITHDRAWAL OF BIDS:

21.1. Any Bidder may withdraw his Bid, either personally or by written request, at any time prior to the scheduled time for opening of Bids or authorized postponement thereof.

21.2. No Bidder may withdraw his Bid for a period of ninety (90) calendar days after the date set for the opening thereof, and all Bids shall be subject to acceptance by the Owner during this period.

22. IRREGULAR BIDS: A Bid will be considered irregular and may be rejected for any one of the following reasons:

22.1. If the Bid is on a form other than that furnished by the Owner; or if the form is altered or any part detached.

22.2. If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the Bid incomplete, indefinite, or ambiguous as to its meaning.

22.3. If the Bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.

22.4. If the Bid does not contain a price for each item listed.

22.5. If the Bid does not contain the aggregate of the Bid, obtained by adding the extended amounts of the various items, if applicable.

22.6. If the Bid contains obviously unbalanced bid prices.

22.7. If there is reason to believe that any Bidder is interested in more than one Bid on the same project or that there has been collusion among the Bidders.

23. DISQUALIFICATION OF BIDDERS: More than one Bid from an individual, a firm or partnership, a corporation or any association, under the same or different names, will not be considered. Reasonable grounds for believing that any Bidder is interested as a principal in more than one Bid for the work contemplated will cause the rejection of all Bids in which such Bidder is believed to be interested. Any or all Bids will be rejected if there is reason to believe that collusion exists among the Bidders. Contracts will be awarded only to responsible Bidders capable of performing the class of work contemplated within the time specified, and having sufficient resources and finances to carry on the work properly.

A contract (subcontract) will not be awarded to any contractor that is in violation of the Clean Air Act and/or the Federal Water Pollution Control Act or that utilizes any facility included in

the EPA list of Violating Facilities (40 CFR part 15) 40 CFR Part 30.410-4. Responsiveness is defined by: The completeness and regularity and whether the bidder maintains permanent place of business, adequate equipment to accomplish work properly within time frame established, adequate financial status to meet obligations contingent to the work and whether technically qualified.

24. ACCEPTANCE OR REJECTION OF BIDS: The Owner reserves the right to reject any and all Bids when such rejection is in the interest of the Owner; to reject the Bid of a Bidder who has previously failed to perform properly or complete on time contracts of a similar nature; and to reject the Bid of a Bidder who is not, in the opinion of the Engineer, in a position to perform the Contract. The Owner also reserves the right to waive any informalities and technicalities in bidding. The Owner may also accept or reject any of the alternates that may be set forth on the Bid.

25. METHOD OF AWARD: Unless all Bids are rejected, the Contract will be awarded to the lowest responsive, responsible Bidder based on low bid or combination of low bid with alternates depending on which is in the best interest of the Owner. A responsive Bidder is defined as one whose Bid is complete and submitted in accordance with the Contract Documents without excisions, exceptions, special conditions or alternate bids (unless specifically requested in the bid form). A responsible Bidder is defined as one who is legally licensed to bid and perform work in the State of South Carolina, maintains a permanent place of business, has adequate plant equipment to complete the work properly and within the established time limit, has adequate financial status to meet his obligations contingent to the work, and is considered by the Owner and Engineer to be capable of performing the work in accordance with the Contract Documents.

26. NOTICE TO PROCEED: The Notice to Proceed will be issued within ten (10) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period; the time may be extended by mutual agreement between the Owner and Contractor. If the Notice to Proceed has not been issued within the ten (10) calendar day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

27. ESTIMATED QUANTITIES: Bidders must satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by examination of the site and a review of the Drawings and Specifications, including Addenda. After Bids have been submitted, the Bidder shall not assert that there was a misunderstanding concerning the quantities of work or of the nature of the work to be done.

28. COMPARISON OF BIDS: Bids will be compared on the basis of the prices stated in the Bid. In the event there is a discrepancy between the unit price and/or the computed total amount, the unit price shall govern.

29. EASEMENTS: The Owner has obtained, or will obtain, permanent easements and temporary construction easements through private property. The temporary construction easements entitle the Contractor to the occupancy and use of the designated area near or adjacent

to the work for purposes related to the work. The Contractor will not encroach on any property unless it has been established that easements have been obtained. On all other land, the Contractor has no rights unless he obtains permission from the proper parties.

30. WORK IN STATE AND COUNTY RIGHTS-OF-WAY: The Owner will obtain the necessary easements and permits for construction across both County and State Highway rights-of-way. The Contractor shall abide by all rules, regulations, and requirements of these agencies in regard to construction under this contract, including the giving of notices, provisions for inspections, and employment of such methods of construction as may be required. Wherever these Specifications may be in conflict with the regulations or requirements of these agencies, such regulations shall govern and these Specifications shall be modified to such extent as necessary to conform to the said rules, regulations, and requirements. Wherever additional costs are incurred due to requirements of these agencies, such additional periods of maintenance, special features of construction, etc., all such costs shall be included in the prices bid. No additional compensation will be allowed for such costs after award of the Contract.

31. ITEMS AND INDETERMINATE ITEMS: The work to be done under this contract has been divided into items, and items having sub items to enable each Bidder to bid on the different portions of the work in accordance with his unit price estimate of their cost, and so that the actual quantity of work executed under each item, or sub item, may be paid for at the unit price bid for the particular item, or sub item, even though such quantity is greater or less than the estimated quantity stated in the Bid.

32. RIGHT TO INCREASE OR DECREASE THE AMOUNT OF WORK:

32.1. The work comprises approximately the quantities shown in the bid form which will be used as a basis for comparison of Bids and not for final estimate. The Owner does not, by expression or by implication, agree that the actual amount of work shall correspond with the estimated quantities.

32.2. The Owner reserves the right to increase or decrease the amount of work under the Contract to the extent of 25% of the work contemplated, at the unit prices quoted in the Bid.

33. SUBCONTRACTS: The Bidder is specifically advised that any person, firm or other party to whom it is proposed to award a subcontract under the contract:

32.1. Must be acceptable to the Owner and Federal Agencies concerned, and

32.2. Must submit Certification by Proposed Subcontractor regarding Compliance with Executive Order 11246. Approval of the proposed subcontract award cannot be given by the Owner unless and until the proposed subcontractor has submitted the Certification and/or evidence showing that it has fully complied with any reporting requirements to which it is or was subject.

Although the bidder is not required to attach such Certifications by proposed subcontractors to his bid, the bidder is hereby advised of this requirement so that appropriate action can be taken to prevent subsequent delay in subcontract awards.

34. FORM OF BID:

34.1. All Bids must be submitted on the blank bid form provided herein and must state the total price for which the Bidder will complete the work in accordance with the terms of the Contract Documents. All blank spaces must be filled in and there shall be no interlineations, alterations, or erasures.

34.2. The Bid must be signed manually by a principal or an officer duly authorized to make contracts. The Bidder's legal name must be fully stated and the name and title of the person signing must be typed below his signature.

35. SUBMITTING BIDS:

35.1. Each Bid must be submitted on the prescribed bid form. All blank spaces for bid prices must be filled in, in ink or typewritten, and the Bid must be fully completed and executed when submitted. Only one copy of the bid form is required.

35.2. Bidders are cautioned that it is the responsibility of each individual Bidder to assure that his Bid is in the possession of the responsible official or his designated alternate prior to the stated time and at the stated place of the bid opening. Owner is not responsible for Bids delayed by mail and/ or delivery services of any nature.

35.3. Each Bid must be submitted in an opaque sealed envelope, plainly marked on the outside, addressed and delivered as shown below. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to the Owner at:

TO: CITY OF SUMTER (hereinafter called "Owner")

FROM: _____

Phone - _____

of the City of _____ County of _____

and State of _____, hereinafter called "Bidder".

**PROJECT: ITB #4-23/24
Westend Park Improvements
City of Sumter, SC**

Gentlemen:

The Bidder, in compliance with your Advertisement for Bids for the construction of above-referenced project, having examined the Drawings and Specifications with related documents and the site of the proposed work, and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of materials and labor, hereby proposes to furnish all labor, materials, and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

The Bidder declares that he has carefully examined the site of the proposed Work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed Work, and the difficulties attendant upon its execution, and that he has carefully read and examined the Drawings, the annexed proposed Agreement, and the Specifications and other Contract Documents therein referred to, and knows and understands the terms and provisions thereof.

Bidder understands that information relative to existing structures, apparent and latent conditions, and natural phenomena, as furnished to him on the Drawings, in the Contract Documents, or by the Owner or the Engineer, carries no guarantee expressed or implied as to its completeness or accuracy, and he has made due allowance, therefore.

He further understands that the quantities of work tabulated in the Bid are only approximate and are subject to increase or decrease as deemed necessary to the performance of the work by the Engineer; and that these quantities as shown will be used in arriving at the total Contract Price and determination of the lowest Bidder.

TIME FOR COMPLETION AND LIQUIDATED DAMAGES: Bidder hereby agrees to commence work under this contract within 15 days of receipt of the Notice to Proceed and to fully complete the project within 150 consecutive calendar days thereafter.

Bidder also agrees to pay \$250/day as liquidated damages for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

ADDENDA: Bidder acknowledges receipt of the following Addenda:

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

SCHEDULE OF PRICES –Westend Park Improvements ITB#4-23/24

Item	Description	Quantity	Unit	Unit Price	Price
1	Mobilization	1	LS		
2	Traffic control	1	LS		
3	Demolition	1	LS		
4	Top Soil	100	CY		
5	Fencing & Gates				
	a. 4' Welded Steel Fencing between columns W/ gates	450	LF		
	b. 4' Welded Steel Fencing around playground W/ gate	270	LF		
	c. 5' Vinyl Coated Chain Link Fence and gates	1	LS		
	d. Basketball Court Fencing	1	LS		
	e. Wood Fencing	655	LF		
	f. Park Entry Gates	2	EA		
6	Grading, Erosion Control & Inspections, (includes bio-swales)	1	LS		
7	Storm Drainage				
	a. 12" RCP PIPE	28	LF		
	b. 6" PVC PIPE	25	LF		
	c. Hooded Inlet	1	EA		
	d. Emergency Spill way	1	EA		
8	Concrete Work				
	a) 4" thick Concrete Sidewalk, includes playground & SCDOT)	1,020	SY		
	b) Standard Curb & Gutter	1,040	LF		
	c) Flush Curb	60	LF		
	d) Wheel Stops	6	EA		
9	Brick Work				
	a. Brick Signage wall w/ cap and lettering and lighting	2	EA		
	b. Lg. Brick Columns	3	EA		
	c. Sm. Brick Columns	22	EA		
10	Asphalt Work				
	a. Parking Lot	1	LS		
	b. SCDOT Asphalt Paving	1	LS		

Item	Description	Quantity	Unit	Unit Price	Price
11	Basketball Courts (with color surfacing)	1	LS		
12	Electrical Work				
	a. Coordination with Duke Energy for Power to Restroom and relocation of power poles	1	LS		
	b. Solar Lighting	1	LS		
13	Striping				
	a. Parking Lot Striping	1	LS		
	b) ADA Striping and Signage	1	LS		
14	Restroom/ Pavilion	1	LS		
15	Site Furniture				
	a. Water Fountain	1	EA		
16	Playground and Surfacing	1	LS		
17	Planting				
	a. Laurel Oak	12	EA		
	b. Shawnee Brave Bald Cypress	5	EA		
	c. Chinese Pistache	5	EA		
	d. Sabal Palmetto	7	EA		
	e. Natchez Crape Myrtle	5	EA		
	f. Teddy Bear Magnolia	12	EA		
	g. Nellie R Stevens holly	19	EA		
	h. Green Giant Arborvitae	35	EA		
	i. Jean May Camellia	33	EA		
	j. Vintage Jade Distylium	54	EA		
	k. Little Richard Abelia	29	EA		
	l. Bourdeaux Dwf. Yaupon	36	EA		
	m. Compact Inkberry	61	EA		
	n. Fizzy Mizzy Itea	107	EA		
	o. Lil' Flirt Spirea	60	EA		
	p. Pink Muhly Grass	109	EA		
	q. Bandwidth Maiden Grass	62	EA		
	r. Big Blue Liriope	295	EA		
	s. Magnus Purple Coneflower	22	EA		
	t. Variegated Japanese Sedge	104	EA		
	u. Jacob Cline Bee Balm	400	EA		
	v. Southern Blue Iris flag Iris	232	EA		
	w. Gray's Sedge	192	EA		
	x. Centipede Sod	30,300	SF		
	y. Flagstone Stepping Stones	1	LS		

Item	Description	Quantity	Unit	Unit Price	Price
18	Irrigation (Design and Install)	1	LS		

TOTAL, BASE BID ITEMS 1-18 Inclusive: \$ _____

Additions to work and deletions from work shall be paid in accordance with these unit prices.

The above unit prices shall include all labor, materials, de-watering, shoring, removal, overhead, profit, insurance, taxes, fees, etc., to cover the finished work of the several kinds called for.

Bidder understands that the Owner reserves the right to reject any or all bids and to waive any informality in the bidding. The Bidder agrees that this Bid shall be good and may not be withdrawn for a period of 90 calendar days after the scheduled closed time for receiving bids.

Upon receipt of written notice of the acceptance of this Bid, Bidder will execute the formal Agreement attached within 10 days and deliver Surety Bonds as required by the General Conditions. The bid security attached in the sum of:

_____ (\$ _____) is to become the property of the Owner in the event the Agreement and Bond are not executed within the time above set forth as liquidated damages for the delay and additional expense to the Owner caused thereby.

The undersigned declares that his firm is (delete those not applicable):

A corporation organized and existing under the laws of the State of _____.

A partnership consisting of _____.

The undersigned declares that the person or person signing this proposal is fully authorized to sign the proposal on behalf of the firm listed and to fully bind the firm listed to all the conditions and provisions thereof.

It is agreed that no person or persons or company other than the firm listed below or as otherwise indicated hereinafter has any interest whatsoever in this proposal or the contract that may be entered into as a result thereof, and that in all respects the proposal is legal and fair, submitted in good faith, without collusion or fraud.

Respectfully Submitted:

(SEAL - if bid is by a Corporation)

Contractor

By: _____

(Type/Print Name)

(Title)

(Street Address)

(City, State, Zip)

S.C. General Contractor's License No. _____

(End Section 01140)

KNOW ALL MEN BY THESE PRESENTS: that we, the undersigned _____
_____, as Principal, and _____, as Surety, are hereby held
and firmly bound unto _____, as OWNER, in the penal sum of
_____ for the payment of which, well and truly to be made, we hereby jointly and
severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed this _____ day of _____, 2024.

The Condition of the above obligation is such that whereas the Principal has submitted to
_____ a certain BID attached hereto and hereby made a part hereof, to enter
into a contract in writing, for the construction of:

ITB #4-23/24
Westend Park Improvements
Sumter, SC

NOW, THEREFORE,

- (a) If the said BID shall be rejected, or in the alternate,
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID,

then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated. The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By: _____

(SEAL)

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

(End of Section 01142)

SECTION 01210

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 2024,

by and between _____ City of Sumter _____,

acting herein through its _____,
(Title of Authorized Official)

hereinafter called "OWNER" and _____,
(Name of Contractor)

doing business as _____
(an Individual), (a Partnership) or (a Corporation)

of the City of _____ Sumter _____, County of _____ Sumter _____, and

State of _____ SC _____, hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

**ITB #4-23/24
Westend Park Improvements
Sumter, SC**

hereinafter called the PROJECT.

2. The CONTRACTOR will furnish all of the materials, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the PROJECT described herein.
3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within 15 calendar days after the date of the NOTICE TO PROCEED and will fully complete the PROJECT within 150 consecutive calendar days unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS. The CONTRACTOR further agrees to pay, as liquidated damages, the sum of \$250.00 for each consecutive calendar day thereafter as hereinafter provided in the GENERAL CONDITIONS.

4. The CONTRACTOR agrees to perform all of the WORK described in the CONTRACT DOCUMENTS and comply with the terms therein for the sum of _____ or as shown in the Bid Schedule.

5. The term "CONTRACT DOCUMENTS" means and includes the following:

- A. Advertisement for Bids
- B. Information for Bidders
- C. Bid
- D. Bid Bond
- E. Agreement
- F. General Conditions
- G. Supplemental Conditions
- H. Performance Bond
- I. Payment Bond
- J. Notice of Award
- K. Notice to Proceed
- L. Change Orders
- M. Drawings prepared by The LandPlan Group South, and listed in the Supplemental Conditions.
- N. Specifications prepared by The LandPlan Group South.
- O. Addenda

No. _____ Dated _____

No. _____ Dated _____

No. _____ Dated _____

No. _____ Dated _____

No. _____ Dated _____

6. The OWNER agrees to pay the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. This Agreement shall be binding on all parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in four (4) counterparts, each of which shall be deemed an original, in the year and day first above written.

OWNER:

(SEAL)

By: _____

(Type or Print Name)

ATTEST:

(Title of Authorized Official)

(Secretary)

(Witness)

CONTRACTOR:

(SEAL)

By: _____

(Type or Print Name)

(Title)

(Street Address)

(City, State, Zip)

ATTEST:

(Secretary)

(Witness)

(End of Section 01210)

INTENTIONALLY BLANK

**CERTIFICATE OF ACKNOWLEDGEMENT OF CONTRACTOR
IF A CORPORATION**

FOR AGREEMENT

STATE OF South Carolina

COUNTY OF Sumter

ON THIS _____ day of _____, 2024, before me

personally came _____, to me known, who being

by me duly sworn, did depose and say as follows:

That he resides at _____

and is the _____ of _____,
(Title of Officer) (Name of Corporation)

the Corporation described in and which executed the foregoing instrument; that he knows the corporate seal of said Corporation; that the seal affixed to the foregoing instrument is such Corporate Seal and it was so affixed by order of the Board of Directors of said Corporation; and that by the like order he signed thereto his name and official designation.

By: _____

(Name) (Title)

(Notary Public) (Seal)

My commission expires: _____

INTENTIONALLY BLANK

SECTION 01212

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

_____, hereinafter called Principal and
(Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____
in lawful money of the United States, for the payment of which sum well and truly to be made,
we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal entered into a
certain contract with the OWNER, dated the _____ day of _____, 2024, a copy
of which is hereto attached and made a part hereof for the construction of:

ITB #4-23/24
Westend Park Improvements
Sumter, SC

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS. PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, in the year and day first above written.

ATTEST:

(Principal) Secretary

(SEAL)

Witness as to Principal

(Street Address)

(City, State, Zip)

ATTEST:

(Surety) Secretary

(SEAL)

Witness as to Surety

(Street Address)

(City, State, Zip)

Principal

By: _____ (S)

(Street Address)

(City, State, Zip)

Surety

Attorney-in-Fact

(Street Address)

(City, State, Zip)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is a Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

(End of Section 01212)

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SECTION 01214

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

_____, hereinafter called
(an Individual, (a Partnership), or (a Corporation)

Principal, and _____
(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____
in lawful money of the United States, for the payment of which sum well and truly to be made,
we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a
certain contract with the Owner, dated the _____ day of _____ 2024, copy of
which is hereto attached and made a part hereof for the construction of:

ITB #4-23/24
Westend Park Improvements
Sumter, SC

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms,
SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the
prosecution of the WORK provided for in such contract, and any authorized extension or
modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and
coke, repairs on machinery, equipment and tools, consumed or used in connection with the

construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four (4) counterparts, each one of which shall be deemed an original, in the year and day first above written.

ATTEST:

_____	_____
(Principal) Secretary	Principal
(SEAL)	By:_____ (S)
_____	_____
Witness as to Principal	(Street Address)
_____	_____
(Street Address)	(City, State, Zip)

(City, State, Zip)	

_____	_____
ATTEST:	Surety
_____	By:_____
(Surety) Secretary	Attorney-in-Fact
(SEAL)	_____
_____	(Street Address)
_____	_____
Witness as to Surety	(City, State, Zip)

(Street Address)	

(City, State, Zip)	

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

(End of Section 01214)

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**CERTIFICATE OF ACKNOWLEDGEMENT OF CONTRACTOR
IF A CORPORATION**

FOR CONTRACT BONDS

STATE OF South Carolina

COUNTY OF Sumter

ON THIS _____ day of _____, 2024 before me
personally came _____, to me known, who
being by me duly sworn, did depose and say as follows:

That he resides at _____

and is the _____ of _____,
(Title of Officer) (Name of Corporation)

the Corporation described in and which executed the foregoing instrument; that he knows the corporate seal of said Corporation; that the seal affixed to the foregoing instrument is such Corporate Seal and it was so affixed by order of the Board of Directors of said Corporation; and that by the like order he signed thereto his name and official designation.

By: _____

(Name) (Title)

(Notary Public) (Seal)

My commission expires: _____

INTENTIONALLY BLANK

SECTION 01219 CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the
duly authorized and acting legal representative of City of Sumter

_____ do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

(Signed)

Date: _____

(End of Section 01219)

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NOTICE OF AWARD

TO: _____

PROJECT DESCRIPTION: ITB #4-23/24; Westend Park Improvements

The OWNER has considered the BID submitted by you on _____, for the above described WORK in response to its Advertisement for Bids and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$ _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out to the OWNER'S acceptance of your BID as abandoned and as forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 2024

City of Sumter
Owner

By: _____

Title

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by _____

This the _____ day of _____, 2024

By _____

Title _____

INTENTIONALLY BLANK

NOTICE TO PROCEED

TO:

Date: _____

Project: **ITB #4-23/24 Westend Park Improvements**

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2024, on or before _____ 2024, and you are to complete the WORK within 150 consecutive calendar days thereafter.

The date of completion of all WORK is therefore _____, 2024.

Owner _____

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____

this the _____ day of _____, 2024

By _____

Title _____

INTENTIONALLY BLANK

1. GENERAL

1.1. **THE CONTRACT DOCUMENTS:** The Contract Documents consist of the Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, Conditions of the Contract (General, Supplemental and Other Conditions), Drawings, Specifications, Addenda, Notice of Award, Notice to Proceed, and Change Orders.

1.2. CORRELATION AND INTENT OF DOCUMENTS:

1.2.1. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

1.2.2. The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, supplies and materials, tools, machinery, equipment, transportation, supervision, temporary construction of any nature, and all other services, facilities and means necessary for the proper execution and completion of the Work in accordance with the Contract Documents and all incidental work necessary to complete the Project in an acceptable manner, and fully complete the work or improvement ready for use, occupancy and operation by the Owner.

1.2.3. Any mention in the Specifications or indication on the Drawings of articles, materials, methods or operations shall require the Contractor to furnish such item or service as if it was fully specified unless it is noted or specified as not in the contract. It is intended that all materials shall be new and best quality in every respect unless otherwise noted or specified. All workmanship, methods of assembly, and erection shall be first class in every respect.

1.3. CONFLICT OR INCONSISTENCY:

1.3.1. If there is any conflict or inconsistency between the provisions of the Supplemental Conditions and the provisions of the other Contract Documents, the provisions of the Supplemental Conditions shall prevail. If there is any conflict or inconsistency between the provisions of the General Conditions and the provisions of any of the Contract Documents other than the Supplemental Conditions, the provisions of the General Conditions shall prevail.

1.3.2. 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.

1.3.3. In case of difference between small-scale and large-scale drawings, the large scale drawings shall govern. Schedules on any contract drawing shall take precedence over conflicting information on that or any other contract drawing. On any of the drawings where a portion of the work is detailed or drawn out and the remainder is shown in outline, the parts detailed or drawn out shall apply also to all other like portions of the work. Where the word "similar" occurs on the drawings, it shall have a general meaning and not be interpreted as being identical, and all details shall be worked out in relation to their location and their connection with other parts of the work.

1.3.4. 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 Engineer, 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.

1.3.5. Should a conflict be discovered within the Contract Documents, the Contractor shall be deemed to have estimated the higher quality way of doing the Work unless he shall have asked for and obtained a decision in writing from the Engineer before entering into this Contract.

1.4. **ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS:** The Contractor may be furnished additional instructions and detail drawings, by the Engineer, 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.

1.5. **SPECIFICATION HEADINGS:**

1.5.1. For convenience of reference, these Specifications are divided into various Divisions, Sections, Subsections and Paragraphs. The titles of these headings shall not be taken as a correct or complete segregation of the various types of material and labor nor as an attempt to outline jurisdictional procedures. The headings shall not be deemed to limit or restrict the content, meaning or effect of such section, subsection, paragraph, provision or part.

1.5.2. The organization of the Specifications into the various headings, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Each subcontract shall be dependent upon its own definite confines, regardless of Divisions of these Specifications. No responsibility, either direct or implied, is assumed by the Owner for omissions or duplications by the Contractor or by any of his subcontractors due to real or alleged errors in arrangement of matter in Contract Documents.

1.6. **DRAWINGS AND SPECIFICATIONS FOR CONSTRUCTION PURPOSES:** The Contractor will be furnished 6 complete sets of Drawings and Specifications to be used during the course of construction. If more than 6 sets are needed, the Contractor will be required to pay the actual cost of printing and handling.

1.7. **DEFINITIONS:** Wherever the words hereinafter defined or pronouns used in their stead occur in the Contract Documents, they shall have the following meanings:

1.7.1. **ADDENDA:** Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Document, Drawings and Specifications by additions, deletions, clarifications or corrections. Such addenda or addenda will take precedent over the position of the general drawings and specifications concerned and will be considered as part of the Contract Documents.

1.7.2. **AGREEMENT:** The Agreement represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements,

either written or oral, including the bidding documents. The Agreement may be amended or modified by a Change Order.

1.7.3. **BID:** The written offer or proposal of the Bidder, submitted on the prescribed form, properly signed and guaranteed, to perform the work at the prices quoted by the Bidder.

1.7.4. **BID BOND:** The security furnished by the Bidder with his proposal for the Project is guaranty he will enter into a contract for the work if his proposal is accepted.

1.7.5. **BIDDER:** Any individual, firm or corporation or combination of same submitting a bid for the work contemplated, acting directly or through a duly authorized representative.

1.7.6. **BONDS:** Bid, Performance and Payment Bonds and other instruments of security furnished by the Contractor and his Surety in accordance with the Contract Documents.

1.7.7. **CALENDAR DAY:** Every day shown on the calendar, Sundays and holidays included.

1.7.8. **CHANGE ORDER:** 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.

1.7.9. **CONTRACT:** The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations or agreements, either written or oral, including the bidding documents. The Contract may be amended or modified by a Change Order.

1.7.10. **CONTRACT DOCUMENTS:** The Contract Documents consist of the Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), the Drawings, the Specifications, Addenda issued prior to execution of the Contract, Notice of Award, Notice to Proceed and Change Orders.

1.7.11. **CONTRACT PRICE:** The total monies payable to the Contractor under the terms and conditions of the Contract Documents.

1.7.12. **CONTRACTOR:**

1.7.12.a. The individual, firm or corporation with whom the Owner has executed the Agreement by which the Contractor is obligated directly, or through Subcontractors, to perform work in connection with the Project.

1.7.12.b. The Contractor is the person or organization identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

1.7.13. **CONTRACT TIME:** The number of calendar days stated in the Contract Documents for the completion of the Work.

1.7.14. **DRAWINGS:** The part of the Contract Documents which show the characteristics and scope of the Work to be performed and which have been prepared or approved by the Engineer.

1.7.15. **EARTH:** An excavated material or material to be excavated; all kinds of material other than rock.

1.7.16. **ELEVATION:** The figures given on the Drawings or in the other Contract Documents after the word "elevation" or abbreviation of it shall mean the distance in feet above the datum adopted by the Engineer.

1.7.17. **ENGINEER:** The person, firm or corporation named as such in the Contract Documents and duly appointed by the Owner to undertake the duties and powers herein assigned to the Engineer, acting either directly or through duly authorized representatives.

1.7.18. **EQUIPMENT:** All machinery, together with the necessary supplies for upkeep and maintenance, and all tools and apparatus necessary for the proper construction and acceptable completion of the work.

1.7.19. **FIELD ORDER:** 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 Engineer to the Contractor during construction.

1.7.20. **FURNISH:** Furnish and install complete, in place, and ready for use.

1.7.21. **INFORMATION FOR BIDDERS:** The Notice to Contractors containing all necessary information as to provisions, requirements, date, place, and time of submitting bids.

1.7.22. **LATEST EDITION:** The current printed document issued eight weeks or more prior to date of receipt of bids.

1.7.23. **MATERIALS:** Any substance specified for use in the construction of the Project and its appurtenances.

1.7.24. **NET COST:** The cost to the Contractor after application of all credits and discounts (excepting only cash discounts) and without the addition of any factor for burden, overhead or indirect cost or profit.

1.7.25. **NOTICE OF AWARD:** The written notice of the acceptance of the Bid from the Owner to the successful Bidder.

1.7.26. **NOTICE TO PROCEED:** Written communication issued by the Owner to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the Work.

1.7.27. **OPTIMUM MOISTURE CONTENT FOR COMPACTION:** The moisture content of a soil calculated on the basis of dry weight of soil at which the soil can be compacted to the approximate maximum density under a specified standard method of compaction.

1.7.28. OWNER: A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the Work is to be performed.

1.7.29. PAYMENT BOND: The approved form of security furnished by the Contractor to guarantee the payment to all persons supplying labor and materials in the prosecution of the work in accordance with the terms of the Contract.

1.7.30. PERFORMANCE BOND: The approved form of security furnished by the Contractor to guarantee the completion of the work in accordance with the terms of the Contract.

1.7.31. PRE-CONSTRUCTION CONFERENCE: A conference following award and prior to start of construction to be attended by a duly authorized representative of the Engineer and by the responsible officials of the Contractor and other affected parties.

1.7.32. PROJECT: The undertaking to be performed as provided in the Contract Documents.

1.7.33. PROPOSAL: The written offer of the Bidder, submitted on the prescribed form, properly signed and guaranteed, to perform the work at the prices quoted by the Bidder.

1.7.34. PROPOSAL FORM: The approved form on which the Owner requires formal bids to be prepared and submitted for the work.

1.7.35. PROPOSAL GUARANTY: The security furnished by the Bidder with his proposal for a Project, as guaranty he will enter into a contract for the work if his proposal is accepted.

1.7.36. PROVIDE: Furnish and install complete, in place, and ready for use.

1.7.37. RESIDENT PROJECT REPRESENTATIVE: The authorized representative of the Owner who is assigned to the Project site or any part thereof.

1.7.38. ROCK: An excavated material or material to be excavated; only boulders and pieces of concrete or masonry exceeding 1/2 cu. yd. in volume, or solid ledge rock which, in the opinion of the Engineer, requires, for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power-operated tool. No soft or disintegrated rock which can be removed with hand pick or power-operated excavator or shovel, no loose shaken, or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the maximum limits of measurement allowed, which may fall into the excavation will be classified as rock.

1.7.39. SHOP DRAWINGS: All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, Supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.

1.7.40. SPECIALIST: An individual or firm of established reputation which is regularly engaged in, and which maintains a regular force of workmen skilled in either manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the contract specifications require installation by a specialist, that term shall also be deemed to mean either the manufacturer of the item, an

individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.7.41. SPECIFICATIONS: A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

1.7.42. STRUCTURES: Bridges, culverts, catch basins, drop inlets, manholes, retaining walls, cribbing, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, and other miscellaneous items which may be encountered in the work, and which are not otherwise classified herein.

1.7.43. SUBBASE: The layer or layers of specified or selected material of designated thickness or rate of application placed on a subgrade to comprise a component of the pavement structure to support the base course, pavement or subsequent layer of the construction.

1.7.44. SUBCONTRACTOR: 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. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative.

1.7.45. SUB-SUBCONTRACTOR: An individual, firm or corporation having a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub- subcontractor or an authorized representative thereof.

1.7.46. SUBGRADE: The top surface of a roadbed upon which the pavement structure and shoulders are constructed.

1.7.47. SUBSTANTIAL COMPLETION: That date as certified by the Engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it is intended.

1.7.48. SUPPLEMENTAL CONDITIONS: Conditions of the Contract other than the General Conditions.

1.7.49. SUPERINTENDENT: The Contractor's authorized representative in responsible charge of the work.

1.7.50. SUPPLIER: Any person or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.

1.7.51. SURETY: The corporation, partnership or individual bound with and for the Contractor for the full and complete performance of the contract, and for the payment of all debts pertaining to the work.

1.7.52. TITLES (OR HEADINGS): The titles or headings of the sections and subsections herein are intended for convenience of reference and shall not be considered as having any bearing on their interpretation.

1.7.53. WORK: All labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the Project.

1.7.54. WRITTEN NOTICE: Any notice to any part of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the Work.

1.7.55. ADDITIONAL DEFINITIONS:

1.7.55.a. Wherever in the Specifications or on the Drawings, the words "as designated", "as detailed", "as directed", "as ordered", "as permitted", "as prescribed", "as provided", "as requested", "as required", or words of like import are used, it shall be understood that the designation, detail, direction, order, permission, prescribed, provision, request or requirement of the Engineer is intended.

1.7.55.b. Similarly, the words "approved", "acceptable", "satisfactory", and words of like import shall mean approved by, acceptable to, or satisfactory to the Engineer.

1.8. ABBREVIATIONS: Where any other following abbreviations are used in the Specifications, they shall have the meaning set forth opposite each.

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturers Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AED	American Equipment Dealers
AFI	American Filter Institute
AGA	American Gas Association
AGC	Associated General Contractors of America, Inc.
AHDGA	American Hot Dip Galvanizers Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMA	Acoustical Materials Association
AMCA	Air Moving and Conditioning Association
ANS	American Nuclear Society
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air Conditioning and Refrigeration Institute
ASA	Acoustical Society of America

ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWPI	American Wood Preservers' Institute
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
CGA	Compressed Gas Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards, U. S. Department of Commerce
CSI	Construction Specification Institute
EIA	Electronic Industries Association
FS	Federal Specification
FSPT	Federation of Societies for Paint Technology
FSS	Federal Specifications, General Services Administration
FHWA	Federal Highway Administration
GA	Gypsum Association
IBI	Insulation Board Institute
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electric and Electronics Engineers
IES	Illuminating Engineering Society
ISA	Instrument Society of America
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
LIA	Lead Industries Association
MBMA	Metal Building Manufacturers Association
MIA	Marble Institute of America
MPTA	Mechanical Power Transmission Association
MS	Military Specification
MSTD	Military Standard
NAAMM	National Association of Architectural Metal Manufacturers
NAFM	National Association of Fan Manufacturers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCMA	National Concrete Masonry Association
NEC	National Electrical Code
NECA	National Electrical Contractors Association, Inc.
NEMA	National Electrical Manufacturers Association
NFC	National Fire Code
NFPA	National Fire Protection Association
NHLA	National Hardware Lumber Association

NLMA	National Lumber Manufacturers Association
NPC	National Plumbing Code
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NTMA	The National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Act
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PEI	Porcelain Enamel Institute
RTI	Resilient Tile Institute
RWMA	Resistance Welder Manufacturers Association
SBI	Steel Boiler Institute
SCDOT	South Carolina Department of Transportation
SCPI	Structural Clay Products Institute
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSBC	Southern Standard Building Code
SSGC	Southern Standard Gas Code
SSPC	Steel Structures Painting Council
TAPPI	Technical Association of the Pulp and Paper Industry
TCA	Tile Council of America
TRB	Transportation Research Board
UL	Underwriters' Laboratories, Inc.

2. OWNER'S RIGHTS AND RESPONSIBILITIES

2.1. CHANGES IN THE WORK:

2.1.1. The Owner, without invalidating the Contract, may make changes in the Work and in the Drawings and Specifications therefor by making alterations therein, additions thereto, or omissions therefrom.

2.1.2. All work resulting from such changes shall be performed and furnished under and pursuant to the terms and conditions of the Contract. If such changes result in an increase or decrease in the work to be done hereunder, or increase or decrease the quantities thereof, adjustment in compensation shall be made therefor as provided in Subsection 7.12 entitled PAYMENT FOR EXTRA WORK.

2.1.3. Except in an emergency endangering life or property, no change shall be made unless in pursuance of a written order from the Engineer authorizing the change, and no claim for additional compensation shall be valid unless the change is so ordered.

2.1.4. The Contractor agrees that he shall neither have nor assert any claim for, or be entitled to, any additional compensation for damages or for loss of anticipated profits on work that is eliminated.

2.2. PROJECT ENGINEER: As Engineer for this project the Owner has retained:

The LandPlan Group South, Inc.
1206 Scott Street
Columbia, SC 29201

2.3. ENGINEER'S AUTHORITY:

2.3.1. The Engineer will be the Owner's representative during the construction period and he will observe the work in progress on behalf of the Owner. The Engineer will have the authority to act on behalf of the Owner in the following matters consistent with Owner's rights and obligations as set forth in these Contract Documents:

- 2.3.1.a. Interpretation of Contract Documents.
- 2.3.1.b. Approval of samples and shop drawings.
- 2.3.1.c. Preparation of supplementary details and instructions.
- 2.3.1.d. Inspection and approval of construction work.
- 2.3.1.e. Preliminary approval of progress payment applications.

2.3.2. Any instructions which the Engineer may issue the Contractor shall be adjudged an interpretation of the Contract requirements and not an act of supervision. The Engineer has no authority, nor accepts any responsibility, either direct or implied, to direct and superintend the construction operations.

2.3.3. The Contractor shall proceed without delay to perform the work as directed, instructed, determined, or decided by the Engineer and shall comply promptly with such directions, instructions, determinations, or decisions. If the Contractor has any objection thereto, he may require that any such direction, instruction, determination, or decision be put in writing and within 10 days after receipt of any such writing, he may file a written protest with the Owner stating clearly and in detail his objections, the reasons therefor, and the nature and amount of additional compensation, if any, to which he claims he will be entitled thereby. A copy of such protest shall be filed with the Engineer at the same time it is filed with the Owner. Unless the Contractor files such written protest with the Owner and Engineer within such 10 day period, he shall be deemed to have waived all grounds for protest of such direction, instruction, determination, or decision and all claims for additional compensation or damages occasioned thereby, and shall further be deemed to have accepted such direction, instructions, determination, or decision as being fair, reasonable, and finally determinative of his obligations and rights under the Contract.

2.4. LIABILITY OF OWNER: No person, firm or corporation, other than the Contractor, who signed this Contract as such, shall have any interest herein or right hereunder. No claim shall be made or be valid either against the Owner or any agent of the Owner and neither the Owner nor any agent of the Owner shall be liable for or be held to pay any money, except as herein provided. The acceptance by the Contractor of the payment as fixed in the final estimate

shall operate as and shall be a full and complete release of the Owner and of every agent of the Owner of and from any and all claims, demands, damages and liabilities of, by or to the Contractor for anything done or furnished for or arising out of or relating to or by reason of the work or for or on account of any act or neglect of the Owner or of any agent of the Owner or of any other person, arising out of, relating to or by reason of the work, except the claim against the Owner for the unpaid balance, if any there be, of the amounts retained as herein provided.

2.5. RIGHTS-OF-WAY AND SUSPENSION OF WORK: The Owner shall furnish all land and rights-of-way necessary for the carrying out of this contract and the completion of the Work herein contemplated and will use due diligence in acquiring said land and rights-of-way as speedily as possible. But it is possible that all lands and rights-of-way may not be obtained as herein contemplated before construction begins, in which event the Contractor shall begin his work upon such land and rights-of-way as the Owner may have previously acquired and no claim for damages whatsoever will be allowed by reason of the delay in obtaining the remaining lands and rights-of-way. Should the Owner be prevented or enjoined from proceeding with the work, or from authorizing its prosecution, either before or after the commencement, by reason of any litigation, or by reason of its inability to procure any lands or rights-of-way for the said work, the Contractor shall not be entitled to make or assert claim for damage by reason of said delay or to withdraw from the contract except by consent of the Owner; but time for completion of the work will be extended to such time as the Owner determines will compensate for the time lost by such delay, such determination to be set forth in writing.

2.6. SURVEYS, PERMITS AND REGULATIONS:

2.6.1. The Owner will furnish all boundary surveys and establish all base lines for locating the principal component parts of the Work together with a suitable number of bench marks adjacent to the Work as shown in the Contract Documents. From the information provided by the Owner, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batter boards, stakes for pile locations and other working points, lines, elevations and cut sheets.

2.6.2. The Contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

2.6.3. Permits and licenses of a temporary nature necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise stated in the Supplemental Conditions. Encroachment permits, easements for permanent structures and permits for permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in Subsection 2.1 entitled CHANGES IN THE WORK.

2.7. LINES, GRADES AND MEASUREMENTS:

2.7.1. The Owner's Engineer will set sufficient base lines and elevations as shown on the Drawings for location of the Work. The Contractor shall employ a registered civil engineer, or land surveyor and shall require said Engineer to establish all lines, elevations, reference marks, batter boards, etc., needed by the Contractor during the progress of the work, and from time to time to verify such marks by instrument or other appropriate means.

2.7.2. The Owner's Engineer shall be permitted at all times to check the lines, elevations, reference marks, batter boards, etc., set by the Contractor, who shall correct any errors in lines, elevations, reference marks, batter boards, etc., disclosed by such check. Such check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the work.

2.7.3. The Contractor shall make, check and be responsible for all measurements and dimensions necessary for the proper construction of, and the prevention of misfittings in, the work.

2.8. OWNER'S RIGHT OF AUDIT: In case the Owner agrees that a Contractor perform work on a cost plus basis, the Owner is to have a full and complete right to audit and make copies of Contractor's or Subcontractor's records with respect to any payment to Owner may be requested to make, or may make, for any work done on a cost plus basis.

2.9. OWNER'S RIGHT TO SEPARATE CONTRACTS:

2.9.1. The Owner reserves the right to let other contracts in connection with the Work under similar General Conditions. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

2.9.2. The Owner may perform additional Work related to the Project by himself, or he may let other contracts containing provisions similar to these. The Contractor will afford the other contractors who are parties to such Contracts (or the Owner, if he is performing the additional Work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work and shall properly connect and coordinate his Work with theirs.

2.10. OWNER'S RIGHT TO DO WORK:

2.10.1. If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this contract, the Owner, after three days' written notice to the Contractor may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor. If such expense shall exceed the unpaid balance, the Contractor shall pay the difference to the Owner on demand.

2.10.2. The Engineer's certificate setting forth the fair and reasonable cost of repairing, replacing, rebuilding or restoring any damaged or defective work or equipment when performed by one other than the Contractor shall be binding and conclusive as to the amount thereof upon the Contractor.

2.11. OWNER'S RIGHT TO TERMINATE CONTRACT: If the Contractor should be adjudged a bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver or trustee should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to Subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner and his representatives, or otherwise be guilty of substantial violation of any provision of the Contract, then the Owner, may, without prejudice to any other right or remedy and after giving the Contractor, and his surety, if any, seven days' written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, as it may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the work including compensation for additional engineering, managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner.

2.12. SUSPENSION OF WORK, TERMINATION AND DELAY: The Owner may suspend the Work or any portion thereof for a period of not more than 90 days or such further time as agreed upon by the Contractor, by written notice to the Contractor and the Engineer, which notice shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension.

2.13. INSPECTIONS AND TESTING: If the Contract Documents, Owner's instructions, laws, ordinances or any public authority having jurisdiction require any work to be specially tested or approved, the Contractor shall give the Owner timely notice of its readiness for observation by the Owner or inspection by another authority, and if the inspection is by another authority rather than the Owner, of the date fixed for such inspection. The required certificates of such inspection shall be secured and paid for by the Contractor. All SCDOT inspections shall be paid for by the General Contractor. Observations by the Owner shall be promptly made, and where practicable, at the source of supply. If any work should be covered up without approval or consent of the Owner, it must, if required by the Owner, be uncovered for examination, at the Contractor's expense.

2.14. INSPECTION OF WORK AWAY FROM THE SITE: If the work to be done away from the construction site is to be inspected on behalf of the Owner during its fabrication, manufacture, or testing, or before shipment, the Contractor shall give notice to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

2.15. PIPE LOCATION: Exterior pipelines will be located substantially as indicated on the Drawings, but the right is reserved to the Owner acting through the Engineer, to make such modifications in location as may be found desirable to avoid interference with structures or for other reasons. Where fittings, etc., are noted on the Drawings such notation is for the

Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

2.16. **PRIOR USE OR OCCUPANCY:** The Owner reserves the right to use or occupy the Work or portion thereof, and to use equipment installed under the Contract, prior to final acceptance. Such use or occupancy will not constitute acceptance of the Work or any part thereof. Despite such use or occupancy, guarantee periods will not begin until the completion of all work under the Contract, unless agreement to the contrary is made in writing between the parties.

2.17. **WEATHER CONDITIONS:** In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor will, and will cause his subcontractors to, protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors so to protect its work, such materials shall be removed and replaced at the expense of the Contractor.

2.18. **OWNER'S RIGHT TO CLEAN UP:** If a dispute arises between the separate contractors as to their responsibility for cleaning up, the Owner may clean up and charge the cost thereof to the Contractor as the Engineer shall determine to be just.

3. CONTRACTOR'S RIGHTS AND RESPONSIBILITIES

3.1. **ACCESS TO WORK:** The Owner, the Engineer, and their officers, agents, servants, and employees plus representatives of the various participating Federal or State agencies may at any and all times and for any and all purposes, enter upon the work and site thereof and the premises used by the Contractor, and the Contractor shall at all times provide safe and proper facilities therefor.

3.2. **ACCIDENT PREVENTION:** In the performance of the contract the Contractor shall comply with the applicable provisions of the regulations issued by the Secretary of Labor pursuant to section 107 of the Contract Work Hours and Safety Standards Act entitled "Safety and Health Regulations for Construction" (29 CFR 1518, renumbered as Part 1926). Occupational Safety and Health Standards (29 CFR Part 1910) issued by the Secretary of Labor pursuant to the Williams-Steiger Occupational Safety and Health Act of 1970 are applicable to work performed by the contractor subject to the provisions of the Act.

3.3. **STATED ALLOWANCES:** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. These allowances shall cover the net cost of the materials and equipment delivered and unloaded at the site, and all applicable taxes. The Contractor's handling costs on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance. If the cost, when determined, is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order which will include additional handling costs on the site, labor, installation costs, overhead, profit and other expenses resulting to the Contractor from any increase over the original allowance.

3.4. **ARCHAEOLOGICAL RIGHTS:** There is a possibility that items of archaeological significance may be found during the excavation of the site. In such event, the Contractor shall stop excavation in the vicinity of the find and notify the Engineer immediately; subsequent excavation work shall proceed as directed by the Engineer. All items found which are considered to have archaeological significance are the property of the Owner.

3.5. **AS-BUILT DRAWINGS:** The Contractor shall designate one set of Drawings for "As-Built Drawings". The Contractor shall indicate on these drawings all field changes affecting various mechanical, electrical, piping and other items as well as locations as actually installed. The "As-Built Drawings" shall be kept current by the Contractor. The "As-Built Drawings" shall be delivered to the Engineer upon completion and acceptance of the work. Final payment for the work will not be made until the "As-Built Drawings" have been completed and delivered as indicated above.

3.6. **OBLIGATIONS OF CONTRACTOR:**

3.6.1. The Contractor shall and will, in good workmanlike manner, do and perform all work and furnish all supplies and materials, tools, machinery, equipment, transportation, supervision, temporary construction of any nature, and all other services, means and facilities except as herein otherwise expressly specified, necessary or proper to perform and complete all work required by this Contract, within the time herein specified, in accordance with the provisions of this Contract and in accordance with the Drawings and Specifications and in accordance with the direction of the Engineer as given from time to time during the progress of the work. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required.

3.6.2. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract and Specifications, and shall do, carry on, and complete the entire work to the satisfaction of the Engineer and the Owner.

3.6.3. The Contractor shall check all dimensions, elevations, quantities and instructions shown on the Drawings or given in the Specifications and shall notify the Engineer should any discrepancy of any kind be found in the Drawings, Specifications or conditions at the site. He will not be allowed to take advantage of any discrepancy, error or omission in the Contract Documents. If any discrepancy is discovered, the Engineer will issue full instructions pertaining thereto and the Contractor shall carry out these instructions as if originally specified.

3.7. **CLAIMS FOR ADDITIONAL COST:** If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give written notice thereof within ten days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property, in which case the Contractor shall proceed in accordance with Subsection 3.27 entitled PROTECTION OF WORK, PROPERTY AND PERSONS IN AN EMERGENCY. No such claim shall be valid unless so made. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Engineer. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

3.8. **CLAIMS FOR DAMAGE:**

3.8.1. If the Contractor makes claim for any damages alleged to have been sustained by breach of contract or otherwise, he shall, within 10 days after occurrence of the alleged breach or within 10 days after such damages are alleged to have been sustained, whichever date is the earlier, file with the Engineer a written, itemized statement in triplicate of the details of the alleged breach and the details and amount of the alleged damages. The Contractor agrees that unless such statement is made and filed as so required, his claim for damages shall be deemed waived, invalid and unenforceable, and that he shall not be entitled to any compensation for any such alleged damages. Within 10 days after the timely filing of such statement, the Engineer shall file with the Owner one copy of the statement together with his recommendations for action by the Owner.

3.8.2. The Contractor shall not be entitled to claim any additional compensation for damages by reason of any direction, instruction, determination or decision of the Engineer, nor shall any such claims be considered, unless the Contractor shall have complied in all respects with the last paragraph of Subsection 2.a entitled ENGINEER'S AUTHORITY, including, but not limited to, the filing of written protest in the manner and within the time therein provided.

3.9. CUTTING AND PATCHING:

3.9.1. The Contractor shall leave all chases or openings for the installation of his own or any other contractor's subcontractor's work, or shall cut the same in existing work, and shall see that all sleeves or forms are at the work and properly set in ample time to prevent delays. He shall see that all such chases, openings, and sleeves are located accurately and are of proper size and shape and shall consult with the Engineer and the contractors and subcontractors concerned in reference to this work.

3.9.2. In case of his failure to leave or cut all such openings or have all such sleeves provided and set in proper time, he shall cut them or set them afterwards at his own expense, but in so doing he shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the written consent and approval of the Engineer.

3.9.3. The Contractor shall carefully fit around, close up, repair, patch, and point around the work specified herein to the satisfaction of the Engineer.

3.9.4. All of this work shall be done by careful workmen competent to do such work and with the proper small hand tools. Power tools shall not be used except where, in the opinion of the Engineer, the type of tool proposed can be used without damage to any work or structure and without inconvenience or interference with the operation of any facility. The Engineer's approval of the type of tool shall not in any way relieve or diminish the responsibility of the Contractor for such damage, inconvenience or interference resulting from the use of such tools.

3.9.5. The Contractor shall not cut or alter the work of any subcontractor or any other contractor, nor permit any of his subcontractors to cut or alter the work of any other contractor or subcontractor except with the written consent of the contractor or subcontractor whose work is to be cut or altered or with the written consent of the Engineer. All cutting and patching or repairing made necessary by the negligence, carelessness, or incompetence of the Contractor or

any of his subcontractors shall be done by or at the expense of the Contractor and shall be the responsibility of the Contractor.

3.10. CLEANING UP:

3.10.1. The Contractor at all times shall keep the site of the work free from rubbish and debris caused by his operation under the Contract. When the work has been completed, the Contractor shall remove from the site of the work all of his plant, machinery, tools, construction equipment, temporary work and surplus materials so as to leave the work and the site clean and ready for use.

3.10.2. All public streets adjacent to the site and all private ways at the site shall be kept clean of debris, spilled materials, and wet and dry earth at all times and shall be cleaned at the end of each working day. When wet earth is encountered, it shall be cleaned from the vehicles before they leave the site and enter streets and private ways.

3.11. NON-COMPLIANCE WITH CONTRACT REQUIREMENTS: In the event the Contractor, after receiving written notice from the Owner of non-compliance with any requirement of this Contract, fails to initiate promptly such action as may be appropriate to comply with the specified requirement within a reasonable period of time, the Owner shall have the right to order the Contractor to stop any or all work under the Contract until the Contractor has complied or has initiated such action as may be appropriate to comply within a reasonable period of time. The Contractor will not be entitled to any extension of contract time or payment for any costs incurred as a result of being ordered to stop work for such cause.

3.12. OVERALL PROJECT COORDINATION: The Contractor shall coordinate all Work of his Contract to produce the required finished Project in accordance with the Contract Documents. Special attention shall be given to the submission of shop drawings, samples, color charts, and requests for substitution within the specified time; furnishing the proper shop drawings to Subcontractors and material suppliers, whose work and equipment is affected by and related thereto; and the furnishing of all information concerning location, type, and size of built-in equipment and materials and equipment utilities. This coordination is in addition to all other coordination requirements called for in the technical sections of the Specifications.

3.13. COMMUNICATIONS: The Contractor shall forward all communications to the Owner through the Engineer.

3.14. NO DISCRIMINATION IN EMPLOYMENT: In connection with the performance of work under this Contract, the Contractor agrees not to discriminate against any employee or applicant for employment because of race, religion, color, or national origin. The aforesaid provision shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

3.15. DRAWINGS AND SPECIFICATIONS AT THE SITE: The Contractor shall maintain at the site one complete set of all Drawings, Specifications, Addenda, approved Shop Drawings, Change Orders and other Modifications, in good and readable condition and marked to record all changes made during construction. These shall be available to the Engineer. The Drawings,

marked to record all changes made during construction, shall be delivered to the Engineer for the Owner upon completion of the work.

3.16. EMPLOY COMPETENT PERSONS: The Contractor shall endeavor to employ only competent persons on the Work. Whenever the Engineer notifies the Contractor in writing that in his opinion any person on the Work is incompetent, unfaithful, disorderly, or otherwise unsatisfactory, or not employed in accordance with the provisions of the Contract, such person shall be discharged from the Work and shall not again be employed on it, except with the written consent of the Engineer. Provided, however, that the failure of the Owner or Engineer to object to an employee is not to be considered acknowledgment or approval of the employee's competence by the Engineer or Owner.

3.17. EMPLOY SUFFICIENT LABOR AND EQUIPMENT: If, in the judgement of the Engineer, the Contractor is not employing sufficient labor, plant, equipment or other means to complete the work within the time specified, the Engineer may, after giving written notice, require the Contractor to employ such additional labor, plant, equipment and other means as the Engineer may deem necessary to enable the work to progress properly.

3.18. EXISTING STRUCTURES: Where the dimensions and locations of existing structures are of importance in the installation or connection of any part of the Work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment which is dependent on the correctness of such information.

3.19. INDEMNIFICATION:

3.19.1. The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses and expenses, including attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable.

3.19.2. In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by an limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefits acts.

3.20. INTOXICATING LIQUORS: The Contractor shall not sell and shall neither permit nor suffer the introduction or use of intoxicating liquors upon or about the work.

3.21. LEGAL ADDRESS OF CONTRACTOR: The Contractor's business address and his office at or near the site of the work are both hereby designated as places to which communications may be delivered. The depositing of any letter, notice, or other communication in a postpaid wrapper directed to the Contractor's business address in a post office box regularly

maintained by the U. S. Postal Service or the delivery at either designated address of any letter, notice, or other communication by mail or otherwise shall be deemed sufficient service thereof upon the Contractor, and the date of such service shall be the date of receipt. The first-named address may be changed at any time by an instrument in writing, executed and acknowledged by the Contractor and delivered to the Engineer. Service of any notice, letter or other communication upon the Contractor personally shall likewise be deemed sufficient service.

3.22. MUTUAL RESPONSIBILITY OF CONTRACTORS:

3.22.1. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate his Work with theirs.

3.22.2. If any part of the Contractor's Work depends for proper execution or results upon the work of any other separate contractor, the Contractor shall inspect and promptly report to the Owner any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor so to inspect and report shall constitute an acceptance of the other contractor's work as fit and proper to receive his Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work. To ensure proper execution of the subsequent work, the Contractor shall measure work already in place and shall at once report to the Owner any discrepancy between the executed work and the Contract Documents.

3.22.3. Should the Contractor cause damage to any separate contractor on the work, the Contractor agrees, upon due notice, to settle with such contractor by agreement or arbitration, if he will so settle. If such separate contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense, and if any judgement against the Owner arises therefrom, the Contractor shall pay or satisfy it and pay all costs incurred by the Owner.

3.23. NIGHT AND SUNDAY WORK:

3.23.1. No work shall be done at night or on Sunday except:

3.23.1.a. Usual protective work, such as pumping and the tending of lights and fires;

3.23.1.b. Work done in case of emergency threatening injury to persons or property;

3.23.1.c. When provided for under Supplemental Conditions as herein specified;

3.23.1.d. If all of the conditions set forth in the next paragraph below are met.

3.23.2. No work other than that included in (3.23.1.a), (3.23.1.b), and (3.23.1.c) above, shall be done at night except when:

3.23.2.a. In the judgment of the Engineer, the work will be of advantage to the Owner and can be performed satisfactorily at night;

3.23.2.b. The work will be done by a crew organized for regular and continuous night work;

3.23.2.c. The Engineer has given written permission for such night work.

3.23.3. Any work necessary to be performed after regular hours, on Sundays, or Legal Holidays, shall be performed without additional expense to the Owner.

3.24. OCCUPYING PRIVATE LAND: The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment, any land outside the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer prior to occupation of private land.

3.25. PERMITS AND RESPONSIBILITIES: The Contractor shall, without additional expense to the Owner, be responsible for obtaining any necessary licenses and permits, and for complying with any applicable Federal, State and municipal laws, codes, and regulations, in connection with the prosecution of the work. He shall be similarly responsible for all damages to persons or property that occurs as a result of his fault or negligence. He shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire construction work, except for any completed unit of construction thereof which theretofore may have been accepted.

3.26. PRECAUTIONS DURING ADVERSE WEATHER:

3.26.1. During adverse weather and against the possibility thereof, the Contractor shall take all necessary precautions so that the Work may be properly done and satisfactory in all respects. When required, protection shall be provided by use of tarpaulins, wood and building-paper shelters, or other approved means.

3.26.2. During cold weather, materials shall be preheated, if required, and the materials and adjacent structure into which they are to be incorporated shall be made and kept sufficiently warm so that a proper bond will take place and a proper curing, aging, or drying will result. Protected spaces shall be artificially heated by approved means which will result in a moist or a dry atmosphere according to the particular requirements of the work being protected. Ingredients for concrete and mortar shall be sufficiently heated so that the mixture will warm throughout when used.

3.26.3. The Engineer may suspend construction operations at any time when, in his judgement, the conditions are unsuitable or the proper precautions are not being taken, whatever the weather may be, in any season. The Contractor agrees that he shall not have or assert any claim for or be entitled to any additional compensation or damages on account of any such suspension.

3.27. PROTECTION OF WORK, PROPERTY AND PERSONS:

3.27.1. 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, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

3.27.2. 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 safeguards for safety and protection. 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 be liable, except damage or loss attributable to the fault of the Contract Documents or to the acts or omissions of the Owner or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

3.28. PROTECTION OF WORK, PROPERTY AND PERSONS IN AN EMERGENCY: In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Owner, shall act to prevent threatened damage, injury or loss. He will give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

3.29. PROTECTION AGAINST WATER AND STORM: The Contractor shall take all precautions necessary to prevent damage to the Work by storms or by water entering the site of the Work directly or through the ground. In case of damage by storm or water, the Contractor shall at his own cost and expense make such repairs or replacements or rebuild such parts of the Work as the Engineer may require in order that the finished work may be completed as required by the Contractor.

3.30. PROTECTION OF EXISTING VEGETATION, STRUCTURES, UTILITIES AND IMPROVEMENTS:

3.30.1. The Contractor will preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the site of the work which is not to be removed and which does not reasonably interfere with the construction work. Care shall be taken in removing trees authorized for removal to avoid damage to vegetation to remain in place. Any limbs or branches of trees broken during such operations or by the careless operation of equipment or by workmen, shall be trimmed with a clean cut and painted with an approved tree pruning compound as approved by the Engineer.

3.30.2. The Contractor will protect from damage all existing improvements or utilities at or near the site of the work, the location of which is made known to him, and will repair or restore any damage to such facilities resulting from failure to comply with the requirements of this Contract or the failure to exercise reasonable care in the performance of the Work. If the Contractor fails or refuses to repair any such damage promptly, the Owner may have the necessary work performed and charge the cost thereof to the Contractor.

3.30.3. The Contractor shall enclose the trunks of trees adjacent to his work and not to be cut, with substantial wooden boxes of such height as may be necessary to protect them from injury from piled material, from equipment, from his operation, or otherwise due to his work. Excavating machinery and cranes shall be of suitable type and shall be operated with care to prevent injury to trees not to be cut and particularly to overhanging branches and limbs.

3.30.4. On paved surfaces, the Contractor shall not use or operate tractors, bulldozers or other power-operated equipment, the treads or wheels of which are so shaped as to cut or otherwise injure such surfaces.

3.31. RESTORATION OF PROPERTY: All existing surfaces, including lawns, grassed and planted areas which have been injured by the Contractor's operations, shall be restored to a condition at least equal to that in which they were found immediately before work was begun. Suitable materials and methods shall be used for such restoration. All restored plantings shall be maintained by cutting, trimming, fertilizing, etc., until acceptance. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of construction period.

3.32. INTERFERENCE WITH AND PROTECTION OF STREETS:

3.32.1. The Contractor shall not close or obstruct any portion of a street, road, or private way without obtaining permits therefor from the proper authorities. If any street, road or private way shall be rendered unsafe by the Contractor's operations, he shall make such repairs or provide such temporary ways or guards as shall be acceptable to the proper authorities.

3.32.2. Streets, roads, private ways, and walks not closed shall be maintained passable and safe by the Contractor, who shall assume and have full responsibility for the adequacy and safety of provisions made therefor.

3.32.3. The Contractor shall, at least 24 hours in advance, notify the highway, police and fire departments in writing, with a copy to the Engineer, if the closure of a street or road is necessary. He shall cooperate with the police department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well lighted, in order to minimize confusion.

3.33. TRAFFIC CONTROL: Where control of traffic is required for public safety, the Contractor shall provide an adequate number of flagmen employed at his own expense.

3.34. CONSTRUCTION DRAINAGE:

3.34.1. The Contractor shall furnish all labor, materials and necessary equipment for the temporary control of surface water and seepage water during construction and keep all excavations, pits and trenches free from water at all times.

3.34.2. The Contractor shall furnish and operate pumps and other equipment required. Dikes and ditches shall be constructed around excavations and elsewhere as necessary to prevent surface water from flooding the excavations or standing in areas adjacent to excavations, in work areas or in material storage areas. The Contractor shall take all necessary precautions to protect adjacent areas and properties at points other than that which would be considered the natural flow, prior to construction, without the expressed consent of the Owner in writing with a copy to the Engineer. He shall take steps to prevent the erosion of soil, earth and other material and the conduction of the eroded materials onto adjacent properties and shall be responsible for the removal of such materials and the restoration of adjacent areas to their original condition.

3.35. RETURN OF DRAWINGS: All copies of Drawings, Specifications and other Documents furnished by the Owner or the Engineer to the Contractor may be used only in connection with the prosecution of the Work and shall be returned by the Contractor upon completion of the Work.

3.36. SITE INVESTIGATION: The Contractor acknowledges that he has investigated and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, water table, tides or similar physical conditions at the site, the confirmation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The Contractor further acknowledges that he has satisfied himself as to character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from information presented by the Drawings and Specifications made a part of this Contract. Any failure by the Contractor to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner.

3.37. SOIL EROSION AND SEDIMENT CONTROL: The Contractor's attention is directed to the fact that unless exposed earth areas are properly cared for during construction, they may result in substantial sedimentation damage downstream from the construction area. The Contractor shall be responsible for conducting his site grading and drainage operations in such manner as to prevent excessive soil erosion of the construction site work areas. He shall at all times provide satisfactory means to prevent the movement and washing of soil onto pavements or into adjacent ditches, swales, inlets, and drainage pipes, to avoid the possibility of these structures becoming clogged with soil. He shall promptly repair all areas which may become eroded and shall clear drainage ditches, swales, and structures of siltation. The Contractor will indemnify and save harmless the Owner and Engineer from and against any and all claims, demands, fines, or assessments, including attorneys' fees and cost of defense arising out of or caused by the Contractor's failure to provide soil erosion and sediment control.

3.38. SUBSURFACE CONDITIONS: The Contractor shall promptly, and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:

3.38.1.a. Subsurface or latent physical conditions of the site differing materially from those indicated in the Contract Documents.

3.38.1.b. Unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

3.38.2. The Owner shall promptly investigate the conditions, and if he finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for, performance of the Work, an equitable adjustment shall be made and the Contract

Documents shall be modified by Change Order. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given the required Written Notice; provided that the Owner may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final payment.

3.39. SUBCONTRACTING:

3.39.1. The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors. The Contractor shall, without additional expense to the Owner, utilize the services of specialty subcontractors on those parts of the work which are specified to be performed by specialty subcontractors.

3.39.2. The Contractor shall not award any work to any subcontractor without prior written approval of the Owner, which approval will not be given until the Contractor submits to the Owner a written statement concerning the proposed award to the subcontractor, which statement shall contain such information as the Owner may require. No request for payment will be approved before this list has been received and reviewed by the Owner.

3.39.3. The Contractor shall not award Work to Subcontractor(s), in excess of 50 percent of the Contract Price, without prior written approval of the Owner.

3.39.4. The Contractor shall be fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts or omissions of persons directly employed by him.

3.39.5. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the Work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provisions of the Contract Documents.

3.39.6. If any other contractor or any subcontractor of any such other contractor shall suffer or claim to have suffered loss, damage or delay by reason of the acts or omissions of the Contractor or of any of his subcontractors, the Contractor agrees to assume the defense against any such claim and to reimburse such other contractor or subcontractor for such loss or damage. The Contractor agrees to and does hereby indemnify and save harmless the Owner from and against any and all claims by such other contractors or subcontractors alleging such loss, damage or delay and from and against any and all claims, demands, costs and expenses, including attorneys' fees, arising out of, relating to or resulting from such claims.

3.39.7. The Contractor shall be responsible for the coordination of the trades, subcontractors, and material men engaged upon his work. The Owner or Engineer will not undertake to settle any differences between the Contractor and his subcontractors or between subcontractors. If any Subcontractor on the project, in the opinion of the Engineer, proves to be incompetent or otherwise unsatisfactory, he shall be replaced if and when directed in writing.

3.40. SUPERVISION:

3.40.1. The Contractor shall keep on his work, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Owner. The superintendent shall not be changed except with the consent of the Owner, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. Important directions shall be confirmed in writing to the Contractor. Other directions shall be so confirmed on written request in each case. The Owner shall not be responsible for the acts or omissions of the superintendent or his assistants.

3.40.2. The Contractor shall give efficient supervision to the Work, using his best skill and attention. He shall carefully study and compare all Drawings, Specifications and other instructions and shall at once report to the Owner any error, inconsistency or omission which he may discover.

3.41. TAXES: The Contractor shall promptly pay federal, state and local taxes which may be assessed against him in connection with the work or his operations under the Agreement and/or the other Contract Documents, including, but not limited to, taxes attributable to the purchase of materials and equipment, to the performance of services, and the employment of persons in the prosecution of the work.

3.42. TEMPORARY HEAT:

3.42.1. The Contractor shall provide temporary heat whenever necessary to protect all Work and materials against injury from dampness and cold and to dry out moisture from the building. Fuel, equipment and method of heating shall be satisfactory to the Owner's Insurer and the Engineer.

3.42.2. Temporary heating apparatus shall be installed and operated in such a manner that finished work will not be damaged thereby.

3.43. SANITARY FACILITIES: The Contractor shall provide adequate sanitary facilities for the use of those employed on the Work. Such facilities shall be made available when the first employees arrive on the site of the Work, shall be properly secluded from public observations, and shall be constructed and maintained during the progress of the Work in suitable numbers and at such points and in such manner as may be required or approved. The Contractor shall maintain the sanitary facilities in a satisfactory and sanitary condition at all times and shall enforce their use. He shall rigorously prohibit the committing of nuisances on the site of the work, on the lands of the Owner, or on adjacent property. The Owner and the Engineer shall have the right to inspect such facilities at all times to determine whether or not they are being properly and adequately maintained.

3.44. TEMPORARY UTILITIES:

3.44.1. The Contractor shall make arrangements for and furnish as a part of the Contract, all electricity, water, lighting and other utilities needed to do the Work called for by the Contract. Any separate contractors having a contract with the Owner shall make arrangements for and

share the cost with the Contractor for the use of the required utilities on a pro rated schedule based on an agreed basis. All Electrical Work shall comply with the National Electrical Code.

3.44.2. The Contractor shall provide and pay for all temporary wiring, switches, connections and meters.

3.44.3. The Contractor shall provide sufficient electric lighting so that all work may be done in a workmanlike manner when there is not sufficient daylight.

3.45. UNCOVERING AND CORRECTION OF WORK:

3.45.1. The Engineer shall be furnished by the Contractor with every reasonable facility for examining and inspecting the work and for ascertaining that the work is being performed in accordance with the requirements and intent of the Contract, even to the extent of requiring the uncovering or taking down of portions of finished work by the Contractor.

3.45.2. Should the work thus uncovered or taken down prove satisfactory, the cost of uncovering or taking down and the replacement thereof shall be considered as extra work unless the original work was done in violation of the Contract in point of time or in the absence of the Engineer or his inspector and without his written authorization, in which case said cost shall be borne by the Contractor. Should the work uncovered or taken down prove unsatisfactory, said cost shall likewise be borne by the Contractor.

3.45.3. The inspection of the work shall not relieve the Contractor of any of his obligations to perform and complete the work as required by the Contract. Defective work shall be corrected and unsuitable materials, equipment, apparatus and other items shall be replaced by the Contractor, notwithstanding that such work, materials, equipment, apparatus and other items may have been previously overlooked or accepted or estimated for payment. If the work or any part thereof shall be found defective at any time before the final acceptance of the work, the Contractor shall forthwith make good such defect in a manner satisfactory to the Engineer; if any materials, equipment, apparatus or other items brought upon the site for use or incorporation in the work, or selected from the same, are condemned by the Engineer as unsuitable or not in conformity with the Specifications or any of the other Contract Documents, the Contractor shall forthwith remove such materials, equipment, apparatus and other items from the site of the work and shall at his own cost and expense make good and replace the same and any material furnished by the Owner which shall be damaged or rendered defective by the handling or improper installation by the Contractor, his agents, servants, employees or subcontractors.

3.45.4. If the Owner deems it inexpedient to correct work injured or done not in accordance with the Contract, an equitable deduction from the Contract Price shall be made therefor.

3.46. COOPERATION WITH UTILITIES:

3.46.1. The Owner will notify all utility companies, all pipe line owners, or other parties affected, and endeavor to have all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction, made as soon as practicable.

3.46.2. Water lines, gas lines, wire lines, sewer lines, water and gas meter boxes, water and gas valve boxes, manholes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the Owners under separate agreement, except as otherwise provided for in the Supplemental Conditions or as noted on the Drawings.

3.46.3. The Drawings will show all known utilities located within the limits of the contract according to information obtained. The accuracy of the Drawings in this respect is not guaranteed by the Owner. The Contractor shall have considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated position. No additional compensation will be allowed for any delays, inconveniences, or damages sustained by him due to any interference from the said utility appurtenances or the operation of moving them.

3.46.4. Unless otherwise provided, the cost of temporary rearrangement of utilities made only in order to facilitate the construction of the work will be borne by the Contractor.

3.47. VERIFICATION OF DIMENSIONS AND ELEVATIONS:

3.47.1. Dimensions and elevations indicated on the Drawings in reference to existing structures, location of utilities, sewer inverts, or other information on existing facilities, are the best available data obtainable but are not guaranteed by the Engineer. The Engineer will not be responsible for their accuracy. Before proceeding with any work dependent upon the data involved, the Contractor shall field check and verify all dimensions, grades, inverts, lines, elevations, or other conditions of limitations at the site of the work to avoid construction errors or damage to existing facilities. If any work is performed by the Contractor, or any subcontractors, prior to adequate verification of applicable data, any resultant extra cost for adjustment of work necessary to conform to existing facilities, shall be assumed by the Contractor without reimbursement or compensation by the Owner.

3.47.2. If the Contractor, in the course of the work, finds any discrepancy between the Drawings and the physical conditions of the locality, or any errors or omissions in the Drawings or in the layout as given by survey points and instructions, he shall immediately inform the Engineer, in writing. The Engineer will promptly investigate the reported conditions and issue such instructions as may be necessary for the proper execution of the work. Any work done after such discovery and prior to receipt of such instructions shall be at the risk of the Contractor.

4. MATERIALS, EQUIPMENT AND WORKMANSHIP

4.1. CHEMICAL USAGE: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, shall show approval of either EPA or U.S.D.A. The use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer and U.S.D.A. instructions.

4.2. TITLE TO MATERIALS: No materials or supplies for the Work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller. The Contractor warrants that he has good title to all materials and supplies used by him, in the Work, free from all liens, claims or encumbrances.

4.3. CORRECTION OF WORK BEFORE COMPLETION:

4.3.1. The Contractor shall promptly remove from the premises all work condemned by the Owner as failing to conform to the Contract Documents, whether incorporated or not and the Contractor shall promptly replace and re- execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance of any part of it.

4.3.2. If the Contractor does not remove such condemned work within a reasonable time, fixed by written notice, the Owner may remove it, and after storing it at the job site for 30 days, due written notice thereof being given the Contractor, the Owner may offer the material for sale and removal from the premises. Net proceeds from such sale shall be for the Contractor's credit against the "Owner's Right to Do Work". If the material has no sale value, the Owner may remove it from the premises and/or otherwise dispose of it. The costs of such disposition shall be deducted from payments to the Contractor as provided in Subsection 2.10 entitled OWNER'S RIGHT TO DO WORK.

4.4. CORRECTION OF WORK AFTER COMPLETION: The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any damage to other work resulting therefrom which shall appear within a period of one year from the date of final acceptance of the work except where longer periods are specified and in accordance with the terms of any special guarantees provided in the Contract.

4.5. CORRECTIONS OF WORK AFTER GUARANTEE PERIOD: It shall be the responsibility of the Contractor to permanently correct all defective items called to his attention within the guarantee period, whether such correction be made within the guarantee period or not. The Contract shall not be fully performed until such permanent corrections are made.

4.6. GENERAL GUARANTY:

4.6.1. The Contractor warrants to the Owner that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not so conforming to these standards may be considered defective. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

4.6.2. Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the work, except where longer periods are specified. If the Contractor shall fail to repair, replace, rebuild or restore such defective or damaged work or equipment promptly after receiving notice,

the Owner shall have the right to have the work done by others in the same manner as is provided for in Subsection 2.10, OWNER'S RIGHT TO DO WORK.

4.6.3. The Contractor shall further guarantee for a period of 24 months that any building or buildings, constructed under this Project, shall be watertight and leak proof at every point and in every area, except where leaks can be attributed to damage to the building by external forces other than storm or foundation settlement. He shall, immediately upon notification by the Owner of water penetration, determine the source of water penetration and, at his own expense, do any work necessary to make the building watertight. He shall also, at his own expense, repair or replace any other damaged material to return the building or buildings to the original accepted condition.

4.6.4. In addition to the foregoing stipulations, the Contractor shall comply with all other guarantees and warranties referred to in any portions of the Contract Documents, the more stringent requirement governing. Unless otherwise specifically stated elsewhere in these Specifications, the date of beginning of all guarantee or warranty periods shall be the date of acceptance of the project.

4.6.5. If for any reason, the Contractor cannot guarantee any part of his work using material or construction methods which have been specified, or shown, he shall notify the Engineer in writing before Contracts are signed, giving reasons together with the name of product and data on substitutions he can guarantee. Should the Contractor fail to so notify the Engineer prior to the signing of Contracts, he will be held to have agreed to guarantee all Work specified or shown.

4.7. HANDLING AND DISTRIBUTION:

4.7.1. The Contractor shall handle, haul and distribute all materials and all surplus materials on the different portions of the work as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the work, and be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the work.

4.7.2. Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

4.8. MANUFACTURER'S DIRECTIONS:

4.8.1. All manufactured articles, material and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturers, unless herein specified to the contrary.

4.8.2. If the specifications or plans are contrary to the manufacturer's directions, the manufacturer shall be contacted by the Contractor before proceeding with the work and the Engineer advised if the manufacturer has any objections to the specified application.

4.9. MATERIALS, SERVICES AND FACILITIES:

4.9.1. It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all labor, supplies and materials, tools, machinery, equipment, transportation, supervision, temporary construction of any nature, and all other services, means and facilities of any nature whatsoever necessary to execute, complete, and deliver the Work within the specified time.

4.9.2. Materials and equipment shall be so stored 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.

4.9.3. Materials, supplies and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.

4.10. MISCELLANEOUS ITEMS:

4.10.1. The work to be done by the Contractor, specified and enumerated under this Contract, shall include any minor details of the Work not specifically mentioned in the Specifications or shown on the Drawings, but obviously necessary for the proper completion of the Work, which shall be considered incidental and as being a part of and included with the Work for which prices are given in the Bid. The Contractor will not be entitled to any additional compensation therefor.

4.10.2. Miscellaneous items and accessories which are not specifically mentioned, but which are essential to produce a complete and properly operating installation or usable structure or plant, providing the indicated function, shall be furnished and installed without change in the contract price. Such miscellaneous items and accessories shall be of the same quality standards, including material, style, finish, strength, class, weight and other applicable characteristics as specified for the major component of which the miscellaneous item or accessory is an essential part, and shall be approved by the Engineer before installation. The above requirement is not intended to include major components not covered by or inferable from the Drawings and Specifications.

4.10.3. MISTAKES OF CONTRACTOR: The Contractor shall promptly correct and make good any and all defects, damages, omissions, or mistakes, for which he and/or his agents, servants, employees or subcontractors are responsible, and he shall pay to the Owner all costs, expenses, losses, and damages resulting therefrom or by reason thereof as determined by the Engineer.

4.11. PROTECTION AGAINST ELECTROLYSIS: Where dissimilar metals are used in conjunction with each other, or against concrete surfaces, suitable insulation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coatings, nonmetallic separators or washers, or other approved materials.

4.12. RIGHT TO MATERIALS: Nothing in the Contract shall be construed as vesting in the Contractor any right of property in the materials, equipment, apparatus and other items furnished after they have been installed or incorporated in or attached or affixed to the work or the site, but all such materials, equipment, apparatus and other items shall, upon being so installed, incorporated, attached or affixed, become the property of the Owner.

4.13. ROYALTIES AND PATENTS: The Contractor shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has information that the process or article specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Owner in writing.

4.14. SUBMITTAL SCHEDULE:

4.14.1. Within 20 days after execution and delivery of the Contract, the Contractor shall prepare and deliver to the Engineer a Submittal Schedule. This includes a list of all submittals required under the Contract. The list shall identify each major group of shop drawings, coordination drawings and schedules and each sample and the planned submission date for each.

4.14.2. After the Engineer's review of the list of submittals, the Engineer will meet with the Contractor for a joint review and correction and adjustment, as necessary, for agreement on the submittal. In addition, at the meeting the duration of the review period for each submittal will be established. The Contractor's planned submission date for each submittal shall allow no less than 15 working days for review and appropriate action before approval of the submittal becomes critical to the progress of the Contractor's work. Within five calendar days after the joint review, the Contractor shall make any necessary revisions to the list of submittals, including duration of the review periods, in accordance with the agreements reached during the joint review and submit two revised copies to the Engineer. No application for partial payment will be approved until the submitted schedule is approved.

4.15. SHOP DRAWINGS:

4.15.1. Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor, and which illustrate some portion of the Work. It shall be the Contractor's responsibility to furnish Shop Drawings as required by the technical specifications or as requested by the Engineer. These submittals must be made no later than is required by the submittal schedule.

4.15.2. Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the contract.

4.15.3. When so specified or if considered by the Engineer to be acceptable, manufacturer's specifications, catalog data, descriptive manner, illustrations, etc., may be submitted for approval in place of shop and working drawings. In such case the requirements shall be as specified for shop and working drawings, insofar as applicable except that the submission shall be in quadruplicate.

4.15.4. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

4.15.5. The Contractor shall check the Shop Drawings, shall coordinate them (by means of coordination drawings wherever required) with the work of all trades involved before submission and shall indicate thereon his approval. Drawings and schedules submitted without evidence of the Contractor's approval may be returned for resubmission.

4.15.6. By approving and submitting Shop Drawings, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each Shop Drawing with the requirements of the Work and of the Contract Documents.

4.15.7. If drawings or schedules show variations from the contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, the Engineer may approve any or all such variations and issue an appropriate change order. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings or schedules may have been approved.

4.15.8. Each Shop Drawing or Coordination Drawing shall have a blank area 5 by 5 inches located adjacent to the title block. The title block shall display the following:

- (1) Number and Title of Drawing
- (2) Date of Drawing
- (3) Revision number and date (if applicable)
- (4) Project Title
- (5) Name of project building or facility
- (6) Name of Contractor
- (7) Name of Subcontractor (if applicable)
- (8) Clear identity of contents and location of work

4.15.9. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer; other drawings shall be returned for correction.

4.15.10. The Contractor shall stamp all drawings which are to be submitted to the Engineer for approval. The rubber stamp shall incorporate the following items:

PROJECT TITLE Westend Park Improvements

CONTRACTOR'S NAME _____

APPROVED BY _____ DATE _____

SPECIFICATION SECTION _____ TRANSMITTAL NO. _____

4.15.11. The review of Shop Drawings will be general only and shall not relieve or in any respect diminish the responsibility of the Contractor for details of design, dimensions, etc., necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.

4.15.12. Should the Contractor submit for approval equipment that requires modifications to the structures, piping, layout, etc., detailed on the Drawings, he shall also submit for approval details of the proposed modifications. If such equipment and modifications are approved, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications. Required structural changes shall be designed and detailed by an Engineer registered in the state in which the project will be constructed. Drawings shall be signed and show registration numbers or may have seal affixed.

4.15.13. Submission of Shop Drawings shall be accompanied by a copy of a transmittal letter containing Project name, Contractor's name, number of drawings, titles, specifications section, and other pertinent data. The submittal shall include four (4) legible copies of Shop Drawings or printed matter

4.15.14. The review of Shop Drawings will be performed by the Engineer as follows:

4.15.14.a. When the submittal conforms fully with the Contract Drawings and Specifications, the Engineer will approve it. The reproducible of each drawing or page of approved submittals will be stamped approved, signed, dated and returned to the Contractor. No changes shall be made to approved drawings by the Contractor. If the Contractor desires to make any change from approved drawings, or pages of approved submittals, he shall notify the Engineer in writing that the approved material has been withdrawn and shall submit the substitution set in accordance with the above procedure.

4.15.14.b. When the submittal clearly does not conform with the Contract Drawings and Specifications, the Engineer will disapprove it by stamping it "Rejected". Rejected submittals shall be corrected and resubmitted within 14 calendar days from the date of rejection. Submittals that are rejected shall not be released for any work.

4.15.14.c. When the submittal has only minor deviations from the Contract Drawings and Specifications, the Engineer will note the deviations and omissions as may be appropriate and approve the submittal subject to the notations by stamping it "Approved as Noted". Approved as Noted submittals may be released for fabrication of work at the Contractor's risk; in any event the submittal shall be corrected and resubmitted for approval within 14 calendar days from the date of approval as noted.

4.15.15. The Contractor shall be responsible for delays resulting from the rejection or approval as noted of incomplete, inadequate, incorrect or otherwise unacceptable submittals.

4.15.16. The Contractor shall assure that only drawings and pages of printed material bearing the Engineer's "Approved" stamp are allowed on the job site.

4.15.17. The Contractor shall submit, at the completion of the Project, one set of all reviewed and correct shop drawings, catalog cuts, and descriptive literature for all Work previously

submitted. These sets shall be sent to the Engineer for the Owner before final Certificate of Payment is issued.

4.16. OPERATING AND MAINTENANCE MANUALS: One copy of each required Operating and Maintenance Manual must be submitted to the Engineer with the first submittal of shop drawings. Five additional copies of each required Operating and Maintenance Manual must be submitted to the Engineer within 14 days of the return of approved shop drawings to the Contractor. No payment will be approved on any equipment for received by the Engineer. These O&M manuals must be addressed specifically to the piece of equipment supplied and shall not be general in nature; each item must be clearly identified and located. Each page must be printed on 8-1/2" x 11" paper or folded to that size in a manner suitable for insertion in a 3-ring binder.

4.17. SAMPLES:

4.17.1. Samples are physical examples furnished by the Contractor to illustrate materials, equipment or workmanship, and to establish standards by which the Work will be judged. It shall be the Contractor's responsibility to furnish samples as required by the technical specifications or as required by the Engineer. These samples must be submitted no later than is required by the Submittal Schedule.

4.17.2. Each sample shall have a label indicating:

- (1) Project Title
- (2) Name of project building or facility
- (3) Name of Contractor
- (4) Name of Subcontractor (if applicable)
- (5) Identification of material with specification section
- (6) Name of producer and brand (if any)

4.17.3. Samples shall be submitted in duplicate unless otherwise noted in the technical specifications and shall be accompanied by a copy of a transmittal letter containing Project Name, Contractor's Name, number of samples, specification section and other pertinent data.

4.17.4. If the Engineer so requires, either prior to or after commencement of the work, the Contractor shall submit samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the Specifications. Such samples shall be furnished, taken, stored, packed and shipped by the Contractor as directed. Except as otherwise expressly specified, the Contractor shall make arrangements for, and pay for, the tests.

4.17.5. All samples shall be packed so as to reach their destination in good condition. To insure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.

4.17.6. The Contractor shall submit data and samples, or place his orders, sufficiently early to provide ample time for consideration, inspection, testing, and approval before the materials and equipment are needed for incorporation in the work. The consequences of his failure to do so shall be the Contractor's sole responsibility.

4.17.7. In order to demonstrate the proficiency of workmen, or to facilitate the choice among several textures, types, finishes, surfaces, etc., the Contractor shall provide such samples of workmanship of wall, floor, finish, etc., as may be required.

4.17.8. When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, equipment performance ratings, and concrete data.

4.18. STORAGE OF MATERIALS AND EQUIPMENT: All excavated materials, construction equipment, and materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

4.19. INSPECTION AND TESTING:

4.19.1. All materials and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Contract Documents.

4.19.2. The General Contractor shall provide all inspection and testing services not required by the Contract Documents.

4.19.3. The Contractor shall provide at his expense the testing and inspection services required by the SCDOT and the Contract Documents.

4.19.4. If the Contract Documents, laws, ordinance, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested, or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer the required certificates of inspection, testing or approval.

4.19.5. Inspections, tests, or approvals by the Engineer or others shall not relieve the Contractor from his obligations to perform the Work in accordance with the requirements of the Contract Documents.

4.19.6. The Engineer and his representatives will at all times have access to the Work. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, an other relevant data and records. The Contractor will provide proper facilities for such access and observation of the Work and also for any inspection or testing thereof.

4.19.7. If any Work is covered contrary to the written instructions of the Engineer it must, if requested by the Engineer, be uncovered for his observation and replaced at the Contractor's expense.

4.19.8. If the Engineer considers it necessary or advisable that covered Work be inspected or tested by others, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate Change Order shall be issued.

4.20. SUBSTITUTIONS:

4.20.1. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract Price and the Contract Documents shall be appropriately modified by Change Order.

4.20.2. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time.

4.21. "OR EQUAL" CLAUSE:

4.21.1. The phrase "or equal" shall be construed to mean that material or equipment will be acceptable only when in the judgement of the Engineer they are composed of parts of equal quality, or equal workmanship and finish, designed and constructed to perform or accomplish the desired result as efficiently as the indicated brand, pattern, grade, class, make or model.

4.21.2. Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, etc., it is intended merely to establish a standard of quality and function; and, any material, article, or equipment of other manufacturers and vendors which will perform adequately the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed, is, in the opinion of the Engineer, of equal substance and function. It shall not be purchased or installed by the Contractor without the Engineer's written approval.

4.22. WAGES AND OVERTIME COMPENSATION: The Contractor and each of his subcontractors shall comply with all applicable State and local laws or ordinances with respect to the hours worked by laborers and mechanics engaged in work on the project and with respect to compensation for overtime.

4.23. NO WAIVER: Neither the inspection by the Owner or the Engineer, nor any order, measurement, approval, determination, decision or certificate by the Engineer, nor any order by the Owner for the payment of money, nor any payment for or use, occupancy, possession or acceptance of the whole or any part of the work by the Owner, nor the extension of time, nor any other act or omission of the Owner or of the Engineer shall constitute or be deemed to be an acceptance of any defective or improper work, materials, or equipment nor operate as a waiver of any requirement or provision of the Contract, or of any remedy, power or right of or herein reserved to the Owner, nor of any right to damages for breach of contract. Any and all rights and/or remedies provided for in the Contract are intended and shall be construed to be cumulative; and, in addition to each and every other right and remedy provided for herein or by law, the Owner shall be entitled as of right to a writ of injunction against any breach or threatened breach of the Contract by the Contractor, by his Subcontractors or by any other person or persons.

4.24. WORK TO CONFORM: During its progress and on its completion, the work shall conform truly to the lines, levels, and grades indicated on the Drawings or given by the Engineer and shall be built in a thoroughly substantial and workmanlike manner, in strict accordance with the Drawings, Specifications, and other Contract Documents and the directions given from time to time by the Engineer. All work done without instruction having been given therefor by the Engineer, without prior lines or levels, or performed during the absence of the Engineer, will not be estimated or paid for except when such work is authorized by the Engineer in writing. Work so done may be ordered uncovered or taken down, removed, and replaced at the Contractor's expense.

4.25. WORKING HOURS:

4.25.1. It is contemplated that all work will be performed during the customary working hours of the trades involved unless otherwise specified in this Contract. Work performed by the Contractor at his own volition outside such customary working hours shall be at no additional expense to the Owner.

4.25.2. Any requests received by the Contractor from occupants of existing buildings to change the hours of work shall be referred to the Owner for determination.

5. INSURANCE, LEGAL RESPONSIBILITY AND SAFETY

5.1. LITIGATION OF DISPUTES; JURISDICTION: The Owner and Contractor agree that this Contract shall be interpreted according to the Laws of the State of South Carolina, and that the appropriate forum and jurisdiction for resolving any disputes and claims shall be the South Carolina Court of Common Pleas for Sumter County.

5.2. 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 Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this contract.

5.3. PERFORMANCE BOND AND PAYMENT BOND: Unless otherwise noted in the Supplemental Conditions, a Performance Bond and a Payment Bond are required. The Contractor shall obtain a Performance Bond and Payment Bond, acceptable to the Owner in a surety company authorized to do business in the state in which the Project is constructed, each for the full amount of the Contract Sum. The bonds shall guarantee the Contractor's faithful performance of the Contract and the payment of all obligations arising thereunder. The bonds shall remain in force until:

5.3.1. The Project has been completed and accepted by the Owner.

5.3.2. The provisions of all guarantees required by these Contract Documents have been fulfilled or the time limitation for all guarantees has expired, or

5.3.3. The time for the filing of all mechanics' liens has expired, whichever is longer, after which it shall become void.

5.3.4. The Contractor shall pay all charges in connection with the bonds as a part of the Contract. One executed copy of the bonds shall be attached to each copy of the Contract before they are returned to the Engineer for the Owner's signature.

5.3.5. If the Contractor defaults, the Contractor or his Surety shall reimburse the Owner for any additional Engineering fees for additional services made necessary because of the Contractor's default.

5.4. ADDITIONAL OR SUBSTITUTE BOND: If at any time the Owner for justifiable cause, shall be or become dissatisfied with the surety or sureties for the Performance and/or Payment Bonds, the Contractor shall within 5 days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished such an acceptable bond to the Owner.

5.5. CHANGES NOT TO AFFECT BONDS: It is distinctly agreed and understood that any changes made in the Work or the Drawings or Specifications therefor (whether such changes increase or decrease the amount thereof or the time required for its performance) or any changes in the manner or time of payments made by the Owner to the Contractor, or any other modifications of the Contract, shall in no way annul, release, diminish or affect the liability of the Surety on the Contract Bonds given by the Contractor, it being the intent hereof that notwithstanding such changes the liability of the Surety on said bonds continue and remain in full force and effect.

5.6. COMPLIANCE WITH LAWS:

5.6.1. The law of the place where the Project is located shall govern the Contract. The Contractor shall abide by all local and State Laws or ordinances to the extent that such requirements do not conflict with Federal laws or regulations. The Contractor shall keep himself fully informed of all existing and future Federal, State and local laws, ordinances, rules and regulations affecting those engaged or employed on the work, the materials and equipment used

in the work or the conduct of the work, and of all orders, decrees and other requirements of bodies or tribunals having any jurisdiction or authority over the same, including, but not limited to the U. S. Department of Labor and Bureau of Standards Safety and Health Regulations for Construction and its amendments as set up under the Williams-Steiger Occupational Safety and Health Act of 1970. If any discrepancy or inconsistency is discovered in the Drawings, Specifications or other Contract Documents in relation to any such law, ordinance, rule, regulation, order, decree or other requirement, the Contractor shall forthwith report the same to the Engineer in writing.

5.6.2. The Contractor shall at all times observe and comply with, and cause all his agents, servants, employees, and subcontractors to observe and comply with all such existing requirements, and he shall protect, indemnify and save harmless the Owner, its officers, agents, servants, and employees, from and against any and all claims, demands, suits, proceedings, liabilities, judgements, penalties, losses, damages, costs and expenses, including attorney's fees, arising from or based upon any violation or claimed violation of any such law, ordinance, rule, regulations, order, decree, or other requirement, whether committed by the Contractor or any of his agents, servants employees, or subcontractors.

5.7. REQUIRED PROVISIONS DEEMED INSERTED: Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein. If through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

5.8. LIENS: If at any time any notice of liens are filed for labor performed or materials or equipment manufactured, furnished, or delivered to or for the Work, the Contractor shall, at its own cost and expense, promptly discharge, remove or otherwise dispose of the same, and until such discharge, removal or disposition, the Owner shall have the right to retain from any monies payable hereunder an amount which, in its sole judgement, it deems necessary to satisfy such liens and pay the costs and expenses, including attorney's fees, of defending any actions brought to enforce the same, or incurred in connection therewith or by reason thereof.

5.9. CLAIMS: If at any time there be any evidence of any claims for which the Contractor is or may be liable or responsible hereunder, the Contractor shall promptly settle or otherwise dispose of the same, and until such claims are settled or disposed of, the Owner may retain from any monies which would otherwise be payable hereunder so much thereof as, in its judgement, it may deem necessary to settle or otherwise dispose of such claims and to pay the costs and expenses, including attorneys' fees, of defending any actions brought to enforce such claims, or incurred in connection therewith or by reason thereof.

5.10. INSURANCE:

5.10.1. The Contractor shall not commence any work until he obtains, at his own expense, all required insurance. Such insurance must have the approval of the Owner as to limit, form, and amount. The Contractor will not permit any Subcontractor to commence work on this project until such Subcontractor has complied with the same insurance requirements.

5.10.2. The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such certificates shall also contain substantially the following statement: "The insurance covered by this certificate will not be canceled or materially altered, except after 10 days notice in writing and delivered by registered mail to the Owner." Should any policy be canceled before final payment by the Owner to the Contractor and the Contractor fails immediately to procure other insurance as specified, the Owner reserves the right to procure such insurance and to deduct the cost thereof from any sum due the Contractor under this Contract.

5.10.3. Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guaranty period. Should such insurance be canceled before the end of the guaranty period and the Contractor fails immediately to procure other insurance as specified, the Owner reserves the right to procure such insurance and to charge the cost thereof to the Contractor.

5.10.4. Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from his operations under this Contract.

5.10.5. The Contractor is required to obtain and maintain for the full period of the Contract the following types of insurance coverage with limits not less than stated below:

5.10.6. WORKMEN'S COMPENSATION INSURANCE

As required by applicable State or territorial law for all of his employees to be engaged in work at the site of the project under this Contract and, in case of any such work sublet, the Contractor shall require the subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work unless such employees are covered by the protection afforded by the Contractor's Workmen's Compensation Insurance. In case any class of employees engaged in hazardous work on the project under this Contract is not protected under the Workmen's Compensation Statute, the Contractor shall provide and shall cause each subcontractor to provide adequate employer's liability insurance for the protection of such of his employees as are not otherwise protected.

5.10.7 COMPREHENSIVE GENERAL LIABILITY

	<u>Bodily Injury Per Person</u>	<u>Bodily Injury Per Accident</u>	<u>Property Damage</u>
Premises and Operations	500,000	1,000,000	500,000
Elevator Liability	500,000	1,000,000	500,000
Products Liability, Including Completed Operations Coverage	500,000	1,000,000	500,000

5.10.8 COMPREHENSIVE AUTOMOBILE LIABILITY

All Owner Automobiles	500,000	1,000,000	500,000
Non-Owned Automobiles	500,000	1,000,000	500,000
Hired Car Coverage	500,000	1,000,000	500,000

5.10.9 SUBCONTRACTOR'S LIABILITY INSURANCE

Same limits as required of the General Contractor.

5.11. ORAL AGREEMENTS: No oral order, objection, claim or notice by any party to the others shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed waiver or modification thereof in writing, and no evidence shall be introduced in any proceeding of any other waiver or modification.

5.12. SAFETY: In accordance with generally accepted construction practices, the Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property affected directly or indirectly by his operations during the performance of the work. This requirement will apply continuously 24 hours per day until acceptance of the work by the Owner and shall not be limited to normal working hours.

5.13. The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

5.13.1. All employees on the Work and all other persons who may be affected thereby;

5.13.2. All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of Subcontractors or Sub-subcontractors; and

5.13.3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

5.14. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

5.15. When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel. The Contractor shall designate a responsible member of his organization at the site whose duty shall be the

prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the Owner and the Engineer.

5.16. The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

6. PROGRESS AND COMPLETION OF WORK

6.1. NOTICE TO PROCEED: Following the execution of the Agreement by the Owner and the Contractor, written Notice to Proceed with the work shall be given by the Owner to the Contractor. The Contractor shall begin and shall prosecute the work regularly and uninterruptedly thereafter (except as provided for herein) with such force as to secure the completion of the work within the Contract Time.

6.2. CONTRACT TIME: The Contractor shall complete, in an acceptable manner, all of the work contracted for in the time stated in the Agreement. Computation of Contract Time shall commence the day to be specified in the Notice to Proceed and every calendar day following, except as herein provided, shall be counted as Contract Time.

6.3. SCHEDULE OF COMPLETION: The Contractor shall submit, at such times as may reasonably be requested by the Engineer, schedules showing the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the various parts of the work, and estimated date of completion of each part.

6.4. WORK CHANGES: The Owner may, as the need arises, order changes in the work through additions, deletions, or modifications to the extent of 25 percent of the Contract Amount, without invalidating the Contract. Compensation and time of completion affected by the change shall be adjusted at the time of ordering such change.

6.5. EXTRA WORK: New and unforeseen items of work found to be necessary, and which cannot be covered by an item or combination of items for which there is a Contract Price, shall be classed as Extra Work. The Contractor shall do such Extra Work and furnish such materials as may be required for the proper completion or construction of the whole work contemplated, upon written order from the Owner as approved by the Engineer. In the absence of such written order, no claim for Extra Work shall be considered. Extra Work shall be performed in accordance with these Contract Documents where applicable and work not covered by such shall be done in accordance with the best construction practice and in a workmanlike manner. Extra Work required in an emergency to protect life and property shall be performed by the Contractor as required.

6.6. EXTENSION OF CONTRACT TIME:

6.6.1. A delay beyond the Contractor's control occasioned by an Act of God, by act or omission on the part of the Owner or by strikes, lockouts, fire, etc., may entitle the Contractor to an extension of time in which to complete the work as agreed by the Owner, provided, however, that the Contractor shall immediately give written notice to the Owner of the cause of such delay.

6.6.2. Act of God shall mean an earthquake, flood, cyclone or other cataclysmic phenomenon of nature. Rain, wind, flood, or other natural phenomenon of normal intensity for the locality

shall not be construed as an Act of God and no reparation shall be made to the Contractor damages to the work resulting therefrom.

6.6.3. All claims for extension of time shall be made in writing to the Engineer no more than 20 days after the occurrence of the delay; otherwise they shall be waived. In the case of continuing cause of delay only one claim is necessary. Any claim should include complete justification for the extent of the delay claimed.

6.6.4. This Subsection does not exclude the recovery of damages for delay for either party under other provisions of the Contract Documents.

6.7. ENGINEER'S CERTIFICATE OF SUBSTANTIAL COMPLETION: When the work to be performed under this Contract is substantially completed in accordance with the Contract Documents, the Engineer shall prepare an Engineer's Certificate of Substantial Completion to be acknowledged and accepted by the Owner and the Contractor. The Certificate may list items to be completed or corrected but such Certificate shall not relieve the Contractor of his obligation to complete all work, whether listed or not, in accordance with the Contract Documents nor will it preclude any right the Owner may have for recourse in accordance with the Contract Documents.

6.8. TERMINATION OF CONTRACTOR'S RESPONSIBILITY: The Contract will be considered complete when all work has been finished, the final review made up by the Engineer, and the project accepted in writing by the Owner. The Contractor's responsibility shall then cease, except as set forth in his Performance Bond, as provided in Subsection 4.6 entitled GENERAL GUARANTY, and as provided in Subsection 6.9 entitled CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT.

6.9. CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT: The making of the final payment by the Owner to the Contractor shall not relieve the Contractor of responsibility for faulty materials or workmanship. The Contractor shall promptly replace any such defects discovered within one year, except where longer periods are specified, from the date of written acceptance of the work.

6.10. PROGRESS SCHEDULE:

6.10.1. Within 20 days after execution and delivery of the Agreement and not less than 10 days prior to making an application for partial payment, the Contractor shall prepare and deliver to the Engineer a Progress Schedule on forms approved by the Engineer.

6.10.2. The schedule shall be set up in a Critical Path format and shall show the proposed dates of commencement and completion of the various subdivisions of work required under the Contract Documents.

6.10.3. The schedule shall show the dates of commencement and completion of the various subdivisions of work required by the Contract Documents and all activities required to accomplish the work. No activity included in the schedule shall have a duration greater than fifteen (15) days. After approval of the Submit Schedule, the Contractor shall incorporate this schedule into the CPM schedule.

6.10.4. The schedule shall be updated monthly. No progress payments will be made unless application is accompanied by the updated schedule.

6.11. SCHEDULES, REPORTS AND RECORDS:

6.11.1. The Contractor shall submit to the Owner such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the Contract Documents for the Work to be performed.

6.11.2. The Contractor shall also submit, in a format as approved by the Engineer, a schedule of payments that he anticipates he will earn during the course of the Work.

6.12. ABANDONMENT OF WORK OR OTHER DEFAULT:

6.12.1. If the work shall be abandoned, or any part thereof shall be sublet without previous written consent of the Owner, or the Contract or any monies payable hereunder shall be assigned otherwise than as herein specified, or if at any time the Engineer shall be of the opinion, and shall so certify in writing, that the conditions herein specified as to rate of progress are not being complied with, or that the work or any part thereof is being unnecessarily or unreasonably delayed, or that the Contractor has violated or is in default under any of the provisions of the Contract, or if the Contractor becomes bankrupt or insolvent or goes or is put into liquidation or dissolution, either voluntarily or involuntarily, or petitions for an arrangement or reorganization under the Bankruptcy Act, or makes a general assignment for the benefit of creditors or otherwise acknowledges insolvency, the happening of any of which shall be and constitute a default under the Contract, the Owner may notify the Contractor in writing, with a copy of such notice mailed to the Surety, to discontinue such work or any part thereof; thereupon the Contractor shall discontinue such work or such part thereof as the Owner may designate; and the Owner may, upon giving notice, by contract or otherwise as it may determine, complete the work or such part thereof and charge the entire cost and expense of so completing the work or such part thereof to the Contractor. In addition to the said entire cost and expense of completing the work, the Owner shall be entitled to reimbursement from the Contractor and the Contractor agrees to pay the Owner any losses, damages, costs and expenses, including attorney's fees, sustained or incurred by the Owner by reasons of any of the foregoing causes. For the purposes of such completion the Owner may for itself or for any contractors employed by the Owner take possession of any and use or cause to be used any and all materials, equipment, plant, machinery, appliances, tools, supplies and such other items of every description that may be found or located at the site of the Work. No equipment or materials may be removed from the Work without the written consent of the Owner.

6.12.2. All costs, expenses, losses, damages, attorney's fees and any and all other charges incurred by the Owner under this Subsection shall be charged against the Contractor and deducted and/or paid by the Owner out of any monies due or payable or to become due or payable under the Contract to the Contractor; in computing the amounts chargeable to the Contractor, the Owner shall not be held to a basis of the lowest prices for which the completion of the work or any part thereof might have been accomplished, but all sums actually paid or obligated therefor to effect its prompt completion shall be charged to and against the account of the Contractor. In case the costs, expense, losses, damages, attorney's fees and other charges together with all payments theretofore made to or for the account of the Contractor are less than the sum which would have been payable under the Contract if the work had been properly performed and completed by the Contractor, the Contractor shall be entitled to receive the difference and, in case such costs, expenses, losses, damages, attorney's fees and other charges,

together with all payments theretofore made to or for the account of the Contractor, shall exceed the said sum, the Contractor shall pay the amount of the excess to the Owner.

7. PAYMENTS TO THE CONTRACTOR

7.1. PRICES FOR WORK: The Owner shall pay and the Contractor shall receive the prices stipulated in the Bid made a part hereof as full compensation for everything performed and furnished and for all risks and obligations undertaken by the Contractor under and as required by the Contract.

7.2. SCHEDULE OF VALUES: Except in cases where unit prices form the basis for payment under the Contract, the Contractor shall, within 20 days of the execution of the Contract and not less than 10 days prior to making an application for partial payment, submit to the Owner in a form approved by the Owner a schedule of values showing a breakdown of the Contract Sum itemized by trade and/or specification sections or as otherwise directed by the Owner and for each item shall show the total value including the Contractor's overhead and profit. Upon approval by the Owner, this schedule will be used in determining the value of the work done for the purpose of partial payments. The costs employed in making up any of these schedules will be used only for determining the basis of partial payments and will not be considered as fixing a basis for additions to or deductions from the Contract Price.

7.3. APPLICATIONS FOR PARTIAL PAYMENT:

7.3.1. Before the first day of each month, or as otherwise directed by the Owner, the Contractor shall make applications for the value of the work done and the materials installed and/or delivered to the site for installation in the project during the previous month. Such applications shall show the breakdown of the project into the same items as the schedule of values specified in Subsection 7.2 entitled SCHEDULE OF VALUES and showing for each item the total value, the value previously reported as complete, the value completed during the month, the cumulative value completed and the value remaining to be done. The application shall also show the value of materials delivered to the site which have not been incorporated into the work and whose value is not included in the amount shown for the work of which they are a part. The value of such materials shall be established by attaching copies of invoices covering the materials to the application. The application shall include a summary of value of the work performed during the previous month, plus the value of the material delivered to the job site but not incorporated in the work, and minus the amount of the retainage indicated in Subsection 7.4 entitled RETAINAGE.

7.3.2. The Engineer will, within 10 days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the Owner, or return the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate.

7.4. RETAINAGE: The Owner shall retain 10 percent of the amount of each payment until final completion and acceptance of all work covered by the Contract Documents. The Owner at any time, however, after 50 percent of the work has been completed, if he finds that satisfactory progress is being made, will make further partial payments in full on the current and remaining

estimates, but amounts previously retained shall not be paid to the Contractor at 50 percent completion or any time thereafter when, in the opinion of the Engineer, the progress of the Work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 10 percent of the value of the work completed. Upon substantial completion of the work, any amount retained may be paid to the Contractor. When the Work has been substantially completed except for Work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the Owner are valid reasons for non-completion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed.

7.5. PAYMENTS WITHHELD:

7.5.1. The Owner may withhold payment or, on account of subsequently discovered evidence, nullify the whole or part of any application to the extent necessary to protect himself from loss on account of:

7.5.1.a. Defective work not remedied.

7.5.1.b. Claims filed or reasonable evidence indicating the probably filing of claims.

7.5.1.c. Failure of the Contractor to make payments to Subcontractors, material suppliers, or employees.

7.5.1.d. A reasonable doubt that the Contract work can be completed for the balance unpaid.

7.5.1.e. Damage to another Contractor.

7.5.2. When the above grounds are removed, payment will be made for the amounts withheld because of them.

7.6. PAYMENT OF APPLICATIONS FOR PARTIAL PAYMENT: Upon verification and approval of the application for partial payment made as specified, the Owner will make payment of the amount found properly due. No payment made to the Contractor nor partial or entire use or occupancy of the Work by the Owner shall be an acceptance of any work or materials not in accordance with this Contract.

7.7. FINAL INSPECTION: Upon receipt of written notice from the Contractor that the work has been completed and finished in accordance with the Contract, the Owner shall cause an inspection to be made of the work by his authorized representatives. A list shall be made of all deviations from the Contract requirements (commonly termed "punch list") and a copy of such list furnished to the Contractor. The Contractor shall with reasonable haste remedy all defects so noted and shall notify the Owner upon the completion of such work. When inspection by the Owner's authorized representatives shows the work to be complete in accordance with the Contract, application for final payment may be made.

7.8. RELEASE OF LIENS: Neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a complete and notarized release of all liens arising out of this Contract, or receipts in full in lieu thereof, and if required in either

case, an affidavit that so far as he had knowledge of information the releases and receipts include all the labor and material for which a lien could be filed; but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

7.9. USE OR PARTIAL PAYMENT NOT ACCEPTANCE: It is agreed that this is an entire contract for one whole and complete work or result and that neither the Owner's entrance upon or use of the Work or any part thereof nor any partial payments by the Owner shall constitute an acceptance of the Work or any part thereof before its entire completion and final acceptance.

7.10. PAYMENT FOR UNCORRECTED WORK: Should the Owner direct the Contractor not to correct work that has been damaged or that was not performed in accordance with the Contract Documents, an equitable deduction from the Contract Amount shall be made to compensate the Owner for the Uncorrected Work.

7.11. PAYMENT FOR REMOVAL OF REJECTED WORK AND MATERIALS:

7.11.1. The removal of work and materials rejected in accordance with Subsection 4.3 entitled CORRECTION OF WORK BEFORE COMPLETION and the re-execution of acceptable work by the Contractor shall be at the expense of the Contractor, and he shall pay the cost of replacing the work of other contractors destroyed or damaged by the removal of the rejected work or materials and the subsequent replacement of acceptable work.

7.11.2. Removal of rejected work or materials and storage of materials by the Owner, in accordance with Subsection 4.3 entitled CORRECTION OF WORK BEFORE COMPLETION, shall be paid by the Contractor within 30 days after written notice to pay is given by the Owner. If the Contractor does not pay the expenses of such removal and after 10 days' written notice being given by the Owner of his intent to sell the materials, the Owner may sell the materials at auction or at private sale and will pay the Contractor the net proceeds therefrom after deducting all the costs and expense that should have been borne by the Contractor.

7.12. PAYMENT FOR EXTRA WORK: Written notice of claims for payment for Extra Work shall be given by the Contractor within ten days after receipt of instructions from the Owner to proceed with the Extra Work and also before any work is commenced, except in emergency endangering life or property. No claim shall be valid unless so made. In all cases, the Contractor's itemized estimate sheets showing all labor and material shall be submitted to the Owner. The Owner's order for Extra Work shall specify any extension of the Contract Time and one of the following methods of payment:

7.12.1. Unit price or combinations of unit prices which form the basis of the original Contract.

7.12.2. A lump sum based on the Contractor's estimate and accepted by the Owner.

7.12.3. Net cost plus a fixed fee. Net costs are defined as follows:

7.12.3.a. Labor costs, including time of foreman while engaged directly upon extra work at rates not greater than the scale of rates for each respective classification of labor customary in the area where the work is performed for each respective job classification.

Labor insurance taxes including amounts paid on a percent of such labor rates or on a cents per hour basis for Workmen's Compensation, Public Liability, Contractor's Contingent Liability and Contractual Liability Insurance and all Federal Old Age and Unemployment Taxes and any other taxes applicable as well as fringe benefits as may be approved by the Engineer.

7.12.3.b. Materials and supplies actually used on the work.

7.12.3.c. Rental charges for necessary equipment, as agreed upon by the Owner and Contractor. Rental charges shall not exceed those published in Rental Rates for Construction Equipment issued by the American Equipment Distributor. Equipment and tools having a value of \$100.00 or less are considered to be "small tools" and, as such, are considered to be part of overhead.

7.13. To the cost under Subparagraph 7.12.3 there shall be added a fixed fee to be agreed upon but not to exceed fifteen (15) percent of the estimated cost of the work. The fee shall be compensation to cover the cost of supervision, overhead, bond, profit and any other general expenses. On work performed by subcontractors, the fixed fee shall not exceed ten (10) percent of the cost of the work.

7.14. PAYMENT FOR WORK SUSPENDED BY THE OWNER: If the work or any part thereof shall be suspended by the Owner and abandoned by the Contractor as provided in Subsection 2.12 entitled SUSPENSION OF WORK, TERMINATION AND DELAY, the Contractor will then be entitled to payment for all work done on the portions so abandoned, plus 15 percent of the value of the abandoned work to compensate for overhead, plant expense, and anticipated profit. This does not relate to under run in quantities.

7.15. PAYMENT FOR WORK BY THE OWNER: The cost of the work performed by the Owner, in accordance with Subsection 2.10 entitled OWNER'S RIGHT TO DO WORK, shall be paid by the Contractor.

7.16. PAYMENT FOR WORK BY THE OWNER FOLLOWING TERMINATION OF CONTRACT BY OWNER: Upon termination of the Contract by the Owner in accordance with Subsection 2.11 entitled OWNER'S RIGHT TO TERMINATE CONTRACT, no further payment shall be due the Contractor until the work is completed. If the unpaid balance of the Contract Amount shall exceed the cost of completing the work including all overhead costs, the excess shall be paid to the Contractor. If the cost of completing the work shall exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The cost incurred by the Owner, as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Owner.

7.17. PAYMENT FOR SAMPLES AND TESTING OF MATERIALS:

7.17.1. Samples furnished all SCDOT required materials and in accordance with Subsection 4.17 entitled SAMPLES, shall be furnished by the Contractor at his expense.

7.17.2. Testing of samples and materials required by SCDOT and furnished in accordance with Subsection 4.17 entitled SAMPLES, shall be arranged and paid for by the Contractor.

7.18. ACCEPTANCE AND FINAL PAYMENT:

7.18.1. When the Contractor shall have completed the work in accordance with the terms of the Contract Documents, he shall certify completion of the work to the Owner and submit a final Request for Payment, which shall be the Contract Amount plus all approved additions, less all approved deductions and less previous payments made. The Contractor shall furnish evidence that he has fully paid all debts for labor, materials, and equipment incurred in connection with the work, and, upon acceptance by the Owner, the Owner will release the Contractor except as to the conditions of the Performance Bond and the Payment Bond, any legal rights of the Owner, required guaranties, and Correction of Faulty Work after Final Payment, and will pay the Contractor's final Request for Payment. The Contractor shall allow sufficient time between the time of completion of the work and approval of the final Request for Payment for the Engineer to assemble and check the necessary data.

7.18.2. The Contractor shall deliver to the Owner a complete release of all liens arising out of this Contract before the retained percentage or before the final Request for Payment is paid.

7.19. ACCEPTANCE OF FINAL PAYMENT AS RELEASE: The acceptance by the Contractor of final payment shall be and shall operate as a release to the Owner of all claims and all liability to the Contractor other than claims in stated amounts as may be specifically excepted by the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents or the Performance Bond and the Payment Bond.

7.20. DELAYS AND DAMAGES:

7.20.1. The date of beginning and the time for completion of the Work are essential conditions of the Contract Documents and the Work embraced shall be commenced on a date specified in the Notice to Proceed.

7.20.2. The Contractor will proceed with the Work at such rate of progress to insure full completion within the Contract Time. It is expressly understood and agreed by and between the Contractor and the Owner that the Contract Time for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the Work. If the Contractor refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will insure its completion within the time specified in the Contract, or any extension thereof, or fails to complete said Work within such time, the Owner may, by written notice to the Contractor and his Surety, terminate his right to proceed with the Work or such part of the work as to which there has been delay. In such event the Owner may take over the Work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the Work is terminated, he and his sureties shall be liable for any damage to the Owner resulting from his refusal or failure to complete the Work within the specified time.

7.20.3. If fixed and agreed liquidated damages are provided in the Contract and if the Owner so terminates the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until such reasonable time as may be required for final completion of the Work together with any increased costs occasioned the Owner in completing the Work.

7.20.4. If fixed and agreed liquidated damages are provided in the Contract, and if the Owner does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the Work is completed or accepted.

7.20.5. The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

7.20.5.a. The delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, Acts of God, acts of the public enemy, acts of the Government in either its sovereign or contractual capacity, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers; and

7.20.5.b. The Contractor, within 10 days from the beginning of any such delay (unless the Owner grants a further period of time before the date of final payment under the Contract), notifies the Owner in writing of the causes of delay.

7.20.6. As used in subparagraph 1, above, the term "subcontractors or suppliers" means subcontractors or suppliers at any time.

7.20.7. The Engineer shall ascertain the facts and the extent of the delay and extend the time for completing the Work when, in his judgment, the findings of fact justify such an extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in these General Conditions. The rights and remedies of the Owner provided in this clause are in addition to any other rights and remedies provided by law or under this Contract. This does not relate to under run in quantities.

(End of Section 01230)

1. CONFLICT OR INCONSISTENCY: If there is any conflict or inconsistency between the provisions of the SUPPLEMENTAL CONDITIONS and the GENERAL CONDITIONS, the provisions of the SUPPLEMENTAL CONDITIONS shall prevail.

2. CONFLICT OF INTEREST: No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiation, making, accepting, or approving any architectural, engineering, inspecting, 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 thereof. No officer, employee, architect, attorney, engineer, or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner who is in 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.

3. CONTRACTOR'S FIELD OFFICE: The Contractor shall maintain a temporary field office near the work for his own use during the period of construction at which readily accessible copies of all Contract Documents shall be kept. The office shall be located where it will not interfere with the progress of the work. In charge of this office, there shall be a responsible and competent representative of the Contractor, duly authorized to receive orders and directions and to put them into effect.

4. CONTRACT MODIFICATION: All changes which affect the cost of the construction of and contract modifications must be approved by the Owner prior to becoming effective. The contract change order will include extra work, work for which quantities have been altered from those shown in the bidding schedule as well as decreases or increases in the quantities of installed units which are different from those shown in the bidding schedule because of final measurements. All changes the project must be authorized by means of a contract change order. All change orders should be recorded on a contract change order as they occur so that they may be included in the partial payment estimate.

5. WATER/SEWER LINE SEPARATION: The horizontal and vertical separation of sewer lines and water mains must be in accordance with Section R61-58.4D(12) of the State Primary Drinking Water Regulations.

5.1 Parallel installation - Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the Department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least eighteen (18) inches above the top of the sewer.

5.2 Crossings - Water mains crossing sewers shall be laid to provide a minimum vertical separation of eighteen (18) inches between the outside of the water main and the outside of the

sewer. This shall be the case whether the water main is either above or below the sewer line. Whenever possible, the water main shall be located above the sewer line. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer line and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing and each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main.

5.2.1 Special Conditions - When it is impossible to obtain the distances specified in R.61-58.4(D)(12)(a) and (b) the Department may allow an alternative design. Any alternative design shall:

5.2.1.1 maximize the distances between the water main and sewer line and the joints of each;

5.2.1.2 use materials which meet the requirements R.61-58.4(D)(1) for the sewer line; and,

5.2.1.3 allow enough distance to make repairs to one of the lines without damaging the other.

5.2.2 Force mains - There shall be at least a ten (10) foot horizontal separation between water mains and sanitary sewer force mains. There shall be an eighteen (18) inch vertical separation at crossing as required in R.61-58.4(D)(12)(a) and (b).

5.2.3 Sewer manholes - No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provided that ductile iron is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.

5.2.4 Drain-fields and Spray-fields - Potable water lines shall not be laid less than twenty-five (25) feet horizontally from any portion of a waste-water tile-field or spray-field, or shall be otherwise protected by an acceptable method approved by the Department.

6. COMPUTATION OF QUANTITIES:

6.1 For estimating quantities in which the computation of areas by geometric methods would be comparatively laborious, it is agreed that a digitizer shall be considered an instrument of precision adapted to the measurement of such areas.

6.2 It is further agreed that the computation of the volume of prisms shall be by the method of average end areas.

7. LIMITS OF NORMAL EXCAVATION:

7.1 In determining the quantities of excavation to which unit prices shall apply, the limits of normal width and depth of excavation shall be as described below, unless other limits are indicated on the Drawings or specified.

7.2 For pipes in trenches, the normal width of the trench shall be measured between vertical planes which are a distance apart equal to the sum of 18 inches plus 1-1/3 times the nominal inside diameter of the pipe. If the width so computed is less than three feet, a width of three feet shall be taken as the normal width for payment. The normal depth shall be measured to a distance of 0.2 foot below the bottom of the pipe in earth and 0.7 foot in rock, unless there be a cradle underneath the pipe; in which case the normal depth shall be measured to the underside of the cradle. The width of trench for the cradle shall be assumed to be that specified above for pipes in trenches.

7.3 For concrete placed directly against undisturbed earth, the normal width and depth of the excavation for such concrete shall be measured to the neat lines of the concrete as indicated on the Drawings or as ordered.

7.4 For concrete placed against rock surfaces resulting from rock excavation, the normal width and depth of the excavation shall be measured to 0.4 foot outside the neat lines of the concrete as indicated on the Drawings or as ordered.

7.5 For other structures, except manholes as noted below, the normal width shall be measured between vertical planes one foot outside the neat lines of the several parts of the structure, except that the width at any elevation shall be measured as not less than the width at a lower elevation. The normal depth shall be measured to the underside of that part of the structure for which the excavation is made.

7.6 No additional width or depth of trenches excavated in earth or rock shall be allowed at standard circular manholes.

7.7 Wherever bell holes are required for jointing pipe, they shall be provided without additional compensation over and above that resulting from measurements as above described.

8. FEDERAL SAFE DRINKING WATER ACT: In accordance with Section 1417 of this Act, any pipe, solder, or flux used in the installation or repair of public water systems and plumbing used for drinking water, must be lead free. Lead free is defined as less than 0.2 percent lead in solder and flux and less than 8.0 percent lead in pipes and fittings. Leaded joints for the repair of cast iron pipes are not included. Lead shot and lead packers in well construction are no longer allowed.

9. WORK ON HIGHWAY RIGHT-OF-WAY: All work performed in roads and street crossings and all work performed on street or road rights-of-way shall be performed in accordance with "Policy for Accommodating Utilities on Highway Rights-of-Way", current issue, by the South Carolina Highway Department.

10. CONNECTIONS MADE TO EXISTING MAINS:

10.1 No existing main shall be cut, tapped, or otherwise disturbed without first obtaining permission in writing from the Owner to make that connection. At least 48 hours notice is required to obtain written approval.

10.2 Connections to mains shall be coordinated with the Office of the County Supervisor so that they are made during a period of low water demand and with a minimum of service interruption.

11. WATER SUPPLY:

11.1 Water supply for the purposes of flushing, disinfecting and pressure testing of the water line will be furnished by the Owner. It shall be the Contractor's responsibility to convey the water to any remote location that is required on the project.

11.2 The Contractor shall install a metering system that complies with AWWA C700 and shall pay the Owner for the water used

12. USE OF PREMISES: The Contractor shall confine his materials, equipment, and the operations of his employees, subcontractors, and suppliers to minimize interference with the Owner's normal operations being carried on in the existing plant and use of yards, roadways, trucking and parking areas. Where connection between new and existing work is necessary and requires shutting down of any existing facilities, services, or areas, these connections shall be made at such times and in such manner as the Owner may direct.

13. PERSONNEL FACILITIES: In order to minimize interference with the operations of the merchants, Contractor shall provide suitable facilities necessary for his personnel for use as lunch rooms, vending areas, first aid rooms, toilets, etc., and shall instruct and supervise his personnel to ensure that the facilities provided by the Owner for the use of its employees are not used by employees of the Contractor. All such personnel facilities provided by the Contractor shall be located adjacent to or within the area of the work.

14. PARKING AREAS: The Contractor shall secure suitable parking areas for his employees.

15. STATE AND LOCAL PERMITS, LICENSES, INSPECTIONS, CERTIFICATES: The Contractor shall obtain such required documents and pay the fees assessed for each division of work for which such permits, licenses, and inspections are required. The Contractor shall also obtain and pay the fees for general permits such as Building Permits and Certificate of Occupancy.

16. SIGNS:

16.1 The Owner reserves the right to all advertising privileges about the job and no signs shall be posted by the Contractor anywhere on the premises without approval by the Owner except those signs, posters, or bulletins required by Federal, State, or local authorities. Directional signs identifying offices and/or storage areas of the Contractor may be erected as required to facilitate work, provided:

16.1.1 The Contractor shall submit to the Owner for approval a scale drawing or sketch of the proposed sign showing size, type of material, painting, and proposed location. All submittal data shall be in triplicate.

16.1.2 The size of the individual sign shall be not greater than 24 inches wide by 12 inches high.

16.1.3 Signs shall be neatly painted on weather-resistant materials.

16.1.4 The signs will be removed upon completion of the job.

16.1.5 No sign shall be erected prior to approval by the Owner.

17. OWNER'S INSURANCE AUTHORITY: During all phases of construction, the Contractor will be required to perform his operations so as to comply expeditiously with the recommendations of the Owner's Insurance Authority.

18. BUILDERS RISK INSURANCE: The Contractor shall procure and maintain during the life of this Contract, Builders Risk Insurance on an all risk basis, on a 100 percent completed value basis on the insurable portion of the project. The Owner, the Contractor, and Subcontractor (as their interest may appear) shall be named as the Insured.

19. FLOOD INSURANCE:

19.1 The Contractor must acquire any flood insurance made available to it under the National Flood Insurance Act of 1968 as amended beginning with the period of construction and maintain such insurance for the entire useful life of the project, if the total value of insurable improvements is \$10,000 or more.

19.2 The amount of insurance required is the total project cost, excluding facilities which are uninsurable under the National Flood Insurance Program such as bridges, dams, water and sewer lines, and underground structures, and excluding the cost of the land, or the maximum limit of coverage made available to the grantee under the National Flood Insurance Act, whichever is less.

20. PUBLICITY: All prime contractors and their subcontractors shall submit to the Owner for approval all publicity items, including photographs, relating to the work of this project. Owner shall approve any and all material prior to release for publication.

21. PROTECTION OF WORK: The Contractor shall at all times, until final acceptance of the work, provide protection of the work, either new or previously existing, from all hazards involved in his operations. All damage suffered by any item of work, including, but not limited to, drains, curbs, doors, equipment, and structures, shall be repaired or the item shall be replaced prior to final acceptance.

22. SPECIAL PRECAUTIONS: At all times during the construction of the project and its component parts, the Contractor shall provide, install, and maintain proper temporary supports, shoring, and bracing to prevent any damage to the work due to all causes. When openings are made in the roof and/or exterior walls, suitable temporary weathertight closures shall be installed and maintained at all times when work is not in progress at that location.

23. SMOKING AND FIRE PROTECTION:

23.1 Smoking is absolutely forbidden except in such areas as the Owner shall designate. The Contractor shall confer with the Owner to determine the areas in which smoking is permitted. It

is the responsibility of the Contractor to enforce "No Smoking" regulations in the restricted areas. The Owner will remove from the premises any person violating the smoking regulations.

23.2 Welding, flame cutting, or other operations involving the use of flame, arc, or sparking devices will not be allowed without adequate protection.

24. POWDER ACTUATED FASTENERS: Whether or not permitted by local code or ordinance, powder actuated fasteners may not be used except on specific approval of the Owner or the Engineer in writing.

25. COMPRESSED AIR: The Contractor shall furnish all compressed air and temporary piping required for the work. Where necessary to locate air compressors within the building, proper ventilation shall be supplied for the compressors. All costs of providing the compressed air shall be borne by the Contractor. No connection or use of the Owner's air supply will be permitted.

26. ELEVATION DATUM: The datum adopted by the Engineer is NGVD 29. All elevations shown on the Drawings or referred to in these specifications refer to this datum.

27. EASEMENTS:

27.1 The Owner has obtained, or will obtain, permanent easements and temporary construction easements through private property. The temporary construction easements entitle the Contractor to the occupancy and use of the designated area near or adjacent to the work for purposes related to the work.

27.2 The Contractor will not encroach on any property unless it has been established that easements have been obtained. On all other land, the Contractor has no rights unless he obtains permission from the proper parties.

28. OCCUPYING PRIVATE LAND: The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, or materials, any land outside the rights-of-way of property of the Owner. A copy of the written consent shall be given to the Engineer.

29. WORK IN STATE AND CITY RIGHTS-OF-WAY:

29.1 Attention is directed to the fact that work will be going on in both City and State highway rights-of-way. The Owner has obtained permission for the Contractor to encroach on these rights-of-way for work.

29.2 The Contractor will be required to conform to the requirements of the South Carolina Department of Transportation, (SCDOT) and the City of Sumter while working within the rights-of-way.

30. SCDHEC DISTRICT ENGINEER INSPECTION: All of the work constructed on this project is subject to the inspection and approval by the South Carolina Department of Health and Environmental Control District Engineer. This inspection and acceptance is in addition to inspection and acceptance of the Engineer.

31. WORK ADJACENT TO TELEPHONE, POWER AND GAS COMPANY STRUCTURES: Where work is being performed within the telephone company or electric and gas company rights-of-way, the Owner has acquired, or will acquire, permission from these agencies to construct facilities within their rights-of-way or easements. In all cases where work is being performed near telephone company or electric or gas company facilities, the Contractor will notify the respective companies of areas in which work is being performed.

32. WORK BEING PERFORMED NEAR WATER LINES: The Contractor will inform the Town as to the areas where work is being performed. It is required of a Contractor to obtain permission from the Department of Public Utilities where alterations to their system are required.

33. TRAFFIC CONTROL:

33.1 The Contractor will comply with the manual published by the South Carolina Department of Highways and Public Transportation entitled "Traffic Controls for Street and Highway Construction and Maintenance Operations, Part V, of the South Carolina Manual on Uniform Traffic Control Devices for Streets and Highways, 1994" or the latest version. Provide traffic control as required and approved by the South Carolina Department of Highways and Public Transportation.

33.2 Upon completion and acceptance of the work or as the need for temporary traffic control devices ceases, they shall be removed by the Contractor and shall remain the property of the Contractor.

33.3 Signs shall be used where warranted to maintain traffic or to call attention to conditions on, or adjacent to, the construction work. Such signs shall be removed when they are no longer required.

33.4 All traffic control and marking devices shall be in accordance with the provisions of the "State of South Carolina Uniform Manual on Traffic Control Devices". Upon completion and acceptance of the work or as the need for temporary traffic control devices ceases, they shall be removed by the Contractor and shall remain the property of the Contractor.

33.5 Signs shall be used where warranted to maintain traffic or to call attention to conditions on, or adjacent to, the construction work. Such signs shall be removed when they are no longer required.

34. LINES, GRADES AND MEASUREMENTS:

34.1 The Contractor shall employ, at his own expense, a competent civil engineer or land surveyor who shall be registered in South Carolina and who shall be thoroughly experienced in field layout work. Said Engineer shall establish all lines, elevations, reference marks, etc., needed by the Contractor during the progress of the work, and from time to time he shall verify such marks by instrument or by other appropriate means. The Owner's Engineer may waive the requirement for the Engineer to be registered in South Carolina upon a presentation of a resume which is satisfactory. The waiving of this requirement may be revoked at any time by the Owner's Engineer.

34.2 Alignment and grade of all pipe, tunnels, and borings shall be continuously controlled by use of lasers established through the pipe or casing, not transferred from another medium. The Contractor shall furnish lasers and accessories as required and approved by the Engineer. The Contractor's Engineer will set and check each laser each day that work is in progress or more often as required to assure continuous accurate control.

34.3 The Contractor's Engineer responsible for lines and grades shall verify to the Owner in writing that work has been constructed to lines and grades as shown on the Drawings. This certification shall accompany each request for payment.

34.4 The Owner's Engineer shall be permitted at any time to check the lines, elevations, reference marks, lasers, etc., set by the Engineer employed by the Contractor, and the Contractor shall correct any errors in lines, elevations, reference marks, lasers, etc., disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve the Contractor of the responsibility for the accurate construction of the entire work.

34.5 The Contractor shall make all measurements and check all dimensions necessary for the proper construction of the work called for by the Drawings and Specifications. During the prosecution of the work, he shall make all necessary measurements to prevent misfitting in said work, and he shall be responsible therefore, and for the accurate construction of the entire work.

34.6 The Owner's Engineer shall have access to all field notes. Field notes will be recorded in bound field books, and carbon copies given the Owner's Inspector at the close of each shift.

35. CITY BUSINESS LICENSE: The successful Bidder and all subcontractors will be required to obtain a business license from the City of Sumter prior to beginning work, if said Bidder does not have a current license.

36. UTILITY LOCATIONS: Prior to beginning any excavation, the Contractor shall notify all public utility companies and have their lines located and marked. The following is a list of utility companies and persons to be contacted for utility locations.

UTILITY SERVICE
OR FACILITY

PERSON TO CONTACT
(NAME, TITLE, & PHONE NO.)

Electric, Gas,

**For all utilities, call:
Palmetto Utility Protection Service
8-1-1
or, 1-888-721-7877**

Telephone

Cable TV

Sewer

City of Sumter

37. DANGER SIGNALS AND SAFETY DEVICES: The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, sufficient red or warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charged the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under this Specifications or contract.

38. PAVEMENT GUARANTEE: The Contractor warrants to the Owner that all materials and workmanship furnished on state roadways are guaranteed in accordance with the terms of the General Conditions, Section 4, General Guaranty, for a period of two years. The Contractor will remedy any settlements or deficiencies of the pavement surface within this period.

39. CLEAN-UP FOLLOWING PAVEMENT INSTALLATION; PUBLIC AND PRIVATE RIGHT-OF-WAYS:

39.1 All work within state, county and city highway right-of-ways is to be conducted in accordance with the contract drawings and specifications, the general and special provisions of the encroachment permit, and the traffic control requirements of the Supplemental Conditions. The work is subject to inspections by highway representatives and their directions regarding activities in right-of-ways.

39.2 Clean-up is a major issue with regards to work in public right-of-ways. Initial clean-up shall be performed daily as it affects roadway safety and drainage. Soils are to be removed from roadways, sidewalks, and drainage ditches and culverts restored. Impediments to drainage and safety such as excess dirt piles, stored materials, lax or incomplete traffic control will not be tolerated.

39.3 To the maximum extent possible, private roadways, drives, offsite drainage ditches and structures shall be restored immediately after the installation of sidewalk and roadway pavements. The restoration or replacement of public or private property shall be scheduled as a top priority work item in the execution of this project.

39.4 Final clean-up, including grassing, shall also be expedited to the maximum extent possible. The Owner reserves the option to direct this work to be performed expeditiously for the protection of the environment and the welfare of the public.

40. PRE-CONSTRUCTION CONFERENCE: Prior to construction, a pre-construction conference will be held with representatives of the Owner, Contractor, the Engineer, and other parties that are stakeholders in the project.

41. SPECIFICATIONS AND DRAWINGS: The following Drawings and Specifications form a part of this Contract as set forth in Paragraph 1.1, Section 01230, GENERAL CONDITIONS. The Drawings bear the general designation:

42. A. THE DRAWINGS ARE LISTED AS FOLLOWS

<u>Sheet No.</u>	<u>Title</u>
1	Cover Sheet
2	Notes
3-4	Existing Conditions
5-6	Demolition Plan
7-8	Layout Plan
9-10	Erosion Control Plan
11-12	Grading & Storm Drainage Plan
13-14	Utility Plan
15-16	Landscape Plan
17-18	Irrigation Plan
19-26	Details
27-29	SCDOT Encroachment Exhibits
-----	Sumter Planting Details
A1.1	Pavilion Roof Plan
A1.2	Pavilion Ceiling Plan
A4.1	Pavilion Elevations
A5.1-A5.2	Pavilion Building Sections
A6.1	Architectural Details
S0.0-S2.1	Structural Plans & Details
P1.1	Pavilion Plumbing Plan
M1.1	Pavilion Mechanical Plan
E1-E2	Electrical Drawings

B. THE SPECIFICATIONS ARE LISTED AS FOLLOWS:

<u>Section No.</u>	<u>Title</u>
02050	Demolition and Removal
02110	Clearing and Grubbing
02210	Unclassified Excavation and Grading
02222	Excavating, Backfilling & Compacting for Utilities
02231	Subgrade
02235	Macadam Base Course
02270	Erosion Control
02271	Engineering Fabric
02275	Stone for Erosion Control
02277	Temporary Silt Fence
02485	Grassing
02500	Chain Link Fence

02511	Bituminous Pavements
02575	Paving Repair & Resurfacing
02614	Brick Work
02616	Pavement Removal and Replacement
02830	Planting
02933	Seeding and Mulching
02995	Clean Up
03100	Concrete Form Work
03200	Concrete Reinforcement
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03310	Brick Foundations

Architectural Specifications

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----- Welded Steel Fence
----- Welded Steel Gate
----- Aluminum Entry Gate
----- Goalsetter
----- Water Fountain
----- SCDOT Encroachment Permit
----- DHEC Permit
----- Geo Tech Report

(End of Section 01232)

GENERAL: The following paragraph establishes the basis for Measurement and payment for the Work to be performed under the respective Bid items listed in the BID, Section 01140.

The Bid Price shall constitute full compensation for doing each item of work including all activities and incidentals required for the installation and completion of each item and accordance with the Contract Drawings, Specifications and requirements.

The Bid Price for each item shall be full compensation for the following activities: Furnishing and installing all materials and equipment, including excavation, disposal of surplus excavated or material, backfill, compaction, all necessary sheeting and bracing, dewatering, handling water flows, removing and replacing base and pavement outside the limits of demolition, property corners, signs, fences, shrubs, lawns, water lines, gas lines, storm drain lines and storm drainage structures, maintenance of drives and streets and protection of power and communication lines. The price shall also constitute full compensation for all barricades, lighting and flagmen as required for the protection of the public and public property.

Each price stated in the BID shall constitute full compensation for each completed item of work.

ITEM NO. 1 MOBILIZATION

The Lump Sum Bid for mobilization shall include:

- 1) The establishment of all temporary offices, buildings, fencing, staging areas, haul routes, and other facilities necessary for the work on the project.
- 2) Surveying and construction staking.
- 3) Performance bond, labor, and materials bond.
- 4) General Liability Insurance; and
- 5) All other work and operations which must be performed, or costs incurred prior to beginning work on the various items on the project site.

The mobilization cost will be paid with the first pay request and shall be limited to 9% of the total contract amount.

Payment, at the amount stated, will be full compensation for the work satisfactorily completed.

ITEM NO. 2 TRAFFIC CONTROL

The Lump Sum Bid for traffic control shall include all costs for material, labor, coordination with SCDOT and/or the city to provide traffic control throughout the life of the project in accordance with SCDOT standards.

The traffic control cost shall be pro-rated equally, by month, over the length of the project.

Payment, at the pro-rated amount, will be full compensation for the work satisfactorily completed.

ITEM NO. 3 DEMOLITION

The Lump Sum Bid for demolition shall include, but not be limited to), all costs for furnishing labor and equipment for the complete removal, salvage, and disposal of existing material necessary for the installation of asphalt parking lot, restroom/pavilion, playground, basketball courts, drainage, brick columns, fencing (to be delivered to city), gates, pavilion, playground(to be delivered to city), landscaping and irrigation. Demolition work includes removal and disposal of concrete sidewalk, asphalt paving, relocation of guy wires, trees, shrubs and incidental items necessary to install new work. Demolition work shall be performed in accordance with Specification Section 02219, DEMOLITION AND REMOVAL. This item does not cover (minor demolition) preparing areas that are currently grassed or planted that will eventually have pavement. Preparing these areas should be included in the Unit Price for the finished surfaces.

Measurement will be on a Lump Sum basis of the demolition work accomplished on site.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEM NO. 4 TOP SOIL

The Unit Price Bid shall be full compensation for the cost of off-site borrow and hauling to stockpiles on-site to supplement topsoil stockpiled during stripping. Sub-grade preparation, placing and rolling of topsoil as required by the plans and specifications in all landscape areas shall be included in Lump Sum Bid Item No. 4.

Topsoil borrow measurement shall be made by the cubic yard, truckload volume, of topsoil delivered to the site.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEMS NO. 5a 4' WELDED STEEL FENCING AND GATES (between columns)

The Unit Price Bid for 4' welded steel fencing and gates (between columns) shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct 4' welded steel fencing (between columns) and gates at the locations indicated on the plans and as specified herein.

Measurement will be in linear feet of new 4' welded steel fencing (between columns) in place and accepted. Completed length of fencing will be measured.

Payment will be made at the Unit Price Bid for 4' welded steel fencing (between columns), measured as specified above and constitute full compensation for the work satisfactorily completed.

ITEMS NO. 5b 4' WELDED STEEL FENCING AND GATES (around playground)

The Lump Sum Bid for 4' welded steel fencing and gates (around playground) shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct 4' welded steel fencing and gates (around playground) at the locations indicated on the plans and as specified herein.

Measurement will be in linear feet of new 4' welded steel fencing and gates (around playground) in place and accepted.

Payment will be made at the Unit Price Bid for 4' welded steel fencing and gates (around playground), measured as specified above and constitute full compensation for the work satisfactorily completed.

ITEMS NO. 5c 5' VINYL COATED CHAN-LINK FENCE AND GATES (at vege. garden)

The Lump Sum Bid for 5' vinyl coated chain-link fence and gates shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct and install vinyl coated chain-link fence and gates at the location indicated on the plans and as specified herein.

Measurement will be on completed and working vinyl coated chain-link fence and gates in place, and accepted.

Payment at the lump sum Bid will be full compensation for the work satisfactorily completed.

ITEM NO. 5d BASKETBALL COURT FENCING

The Lump Sum Bid for Basketball Court Fencing shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct Basketball Court Fencing at the locations indicated on the plans and as specified herein.

Measurement will be on a Lump Sum basis of the Basketball Court Fencing, installed and accepted/ accomplished on site.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEM NO. 5e 6' WOOD FENCING

The Lump Sum Bid for 6' wood fencing shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct 6' wood fencing at the locations indicated on the plans and as specified herein.

Measurement will be in linear feet of new 6' wood fencing in place and accepted.

Payment will be made at the Unit Price Bid for 6' wood fencing, measured as specified above and constitute full compensation for the work satisfactorily completed.

ITEM NO. 5f PARK ENTRY GATES

The Lump Sum Bid for park entry gates shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct park entry gates at the locations indicated on the plans and as specified herein.

Measurement will be on a Lump Sum basis of the park entry gates, installed and accepted/ accomplished on site.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEMS NO. 6 GRADING, EROSION CONTROL AND INSPECTIONS

The Unit Price Bid for grading, erosion control and inspections shall include all costs for furnishing all materials, labor, and equipment to grade the existing site to install the work shown at the location shown on the drawings, provide erosion control and inspections as required by the SCDHEC and Sumter City-County planning. The Bid Price shall also include all bio swale components and preparation costs, including but not necessarily limited to compaction, and disposal of any excess materials.

Measurement will be on a competed graded site, erosion control installed and inspection completed.

Payment at the lump sum Bid will be full compensation for the work satisfactorily completed

ITEMS NO. 7a & 7b STORM DRAINAGE PIPE

The Unit Price Bid for installing drain pipes and drainage structures indicated on the drawings shall include the costs for furnishing and installing the drain pipe lines, drainage structures, installing stone base as well as the costs of trench excavation, disposal of excess excavated material off-site, sheeting and bracing, dewatering, removal and disposal of existing storm drainage pipes indicated in the drawing, locating, avoiding, and working around existing utilities. The Contractor shall also include the cost for coordination of relocating utilities with utility owners and other associated administrative expenses. Hauling of fill materials, filling of ditches as shown in the Details, backfilling, compaction, grading, drain line tie-in to existing structures, and all other work associated with the requirements for the pipe installation shall also be included.

Measurement for drain pipe lines shall be in linear feet along the center line of the pipe as measured horizontally from the inside face of the outlet drainage structure to the inside face of

the inlet drainage structure. This will reflect the actual length of pipe installed. Drain pipe lines without drainage structure inlet or outlet shall be measured to the end of the pipe.

Measurement of drainage structures shall be for each structure installed and accepted.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEMS NO. 7c & 7d DRAINAGE STRUCTURES

The Unit Price Bid for drainage structures shall include furnishing the materials, labor and equipment, as well as the cost, including but not necessarily limited to, for excavation, removal of drop inlet, if necessary, shoring, dewatering, backfilling, compaction, and disposal of any excess material, in the installation of drop inlets, drop in-let tie ins, drop inlet repairs, Outlet structure and concrete spillway, at the locations specified on the drawings and in accordance with Specification Section 02454, STRUCTURES and SCDOT standards. Frames and covers are to be included in the Unit Bid price.

The method of measurement will be the number of drop inlets, junction boxes, drop inlet tie ins, drop inlet repairs installed and accepted.

Payment, at the Unit Price Bid, will be full compensation for each item of work satisfactorily completed.

ITEMS NO. 8a CONCRETE WORK (4" SCORED CONCRETE SIDEWALK)

The Unit Price Bid for concrete sidewalk: 4" thick shall include all costs for furnishing all materials, labor, and equipment to install concrete sidewalks (site, playground& SCDOT ROW) at the locations on the drawings and in CAST-IN-PLACE CONCRETE. The Bid Price shall also include all preparation costs, including but not necessarily limited to, excavation, grading, forming, reinforcing, compaction, and disposal of any excess materials.

Measurement will be on a square yard basis of the completed concrete sidewalk surface installed and accepted.

Payment at the Unit Price Bid will be full compensation for the work satisfactorily completed.

ITEM NO. 8b STANDARD CONCRETE CURB AND GUTTER

The Unit Price Bid for concrete curb and gutter shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct concrete curb and gutter at the locations indicated on the plans and as specified herein.

Measurement will be in linear feet of new concrete curb and gutter in place, and accepted. Length of curb and gutter will be measured; drop inlets and type 16 curb inlets will not be included.

Payment will be made at the Unit Price Bid for concrete curb and gutter, measured as specified above and constitute full compensation for the work satisfactorily completed.

ITEM NO. 8c. CONCRETE FLUSH CURB

The Unit Price Bid for concrete flush curb shall include (but not be limited to), all costs for furnishing all material, labor, and equipment required to construct concrete flush curb at the locations indicated on the plans and as specified herein.

Measurement will be in linear feet of new concrete flush curb in place, and accepted. Length of curb will be measured; drop inlets and type 16 curb inlets will not be included. Flush Curb will be measured at all handicap and driveways.

Payment will be made at the Unit Price Bid for concrete flush curb, measured as specified above and constitute full compensation for the work satisfactorily completed.

ITEMS NO. 8d CONCRETE WHEEL STOPS

The Unit Price Bid for concrete wheel stops shall include all costs for furnishing all materials, labor, and equipment to install concrete wheel stops at the location on the drawings and in CAST-IN-PLACE CONCRETE. The Bid Price shall also include all preparation costs, including but not necessarily limited to, excavation, grading, forming, reinforcing, compaction, and disposal of any excess materials.

Measurement will be on a lump sum basis of the completed concrete wheel stops.

Payment at the Unit Price Bid will be full compensation for the work satisfactorily completed.

ITEM NO. 9a LOW BRICK SIGNAGE WALL

The Lump Sum Bid for brick work shall include (but not be limited to), all cost for furnishing material, labor and equipment required for the installation of Low Brick Signage Wall in accordance with the drawings and specifications including detailing as shown in the drawings. The price shall also include the installation of columns, concrete foundations, cast stone cap, lettering, lighting, logo, contractor designed up lighting system and any other ancillary portions of the work.

Measurement will be on a lump sum cost of low brick signage wall installed and completed.

Payment will be made at the Unit Price Bid for low brick signage wall, measured as specified above.

Payment will constitute full compensation for the work satisfactorily completed and accepted.

ITEM NO. 9b LARGE BRICK COLUMNS WITH CAP

The Unit Price Bid for brick work shall include (but not be limited to), all cost for furnishing material, labor and equipment required for the installation of Large Brick Columns with Cap in accordance with the drawings and specifications including detailing as shown in the drawings. The price shall also include the installation of columns, concrete foundations, cast stone cap and any other ancillary portions of the work.

Measurement will be on a per each cost of large brick column and cap installed and completed.

Payment will be made at the Unit Price Bid for each large brick column and cap, measured as specified above. Payment will constitute full compensation for the work satisfactorily completed and accepted.

ITEM NO. 9c SMALL BRICK COLUMNS WITH CAP

The Unit Price Bid for brick work shall include (but not be limited to), all cost for furnishing material, labor and equipment required for the installation of Small Brick Columns with Cap in accordance with the drawings and specifications including detailing as shown in the drawings. The price shall also include the installation of columns, concrete foundations, cast stone cap and any other ancillary portions of the work.

Measurement will be on a per each cost of small brick column and cap installed and completed.

Payment will be made at the Unit Price Bid for each small brick column and cap, measured as specified above. Payment will constitute full compensation for the work satisfactorily completed and accepted.

ITEM NO. 10a, & b ASPHALT PAVING

The Lump Sum Bid for the Asphalt Paving shall include (but not be limited to) all costs associated with installation of asphalt paving with in the park and SCDOT right of way and base as required by the engineer, hauling of the waste materials to City of Sumter public works department, cleaning the construction area, and furnishing all asphaltic concrete pavement, bituminous tack coat, material, labor, and equipment required to pave within the limits shown and all additional labor and equipment necessary to complete the work as described in the drawings and in accordance with specifications. Dispose of waste material in a manner consistent with local, State and Federal regulations.

The asphalt paving will be paid based on the Lump Sum bid basis of the work completed.

Payment at the Unit Price Bid for asphalt paving will be full compensation for work satisfactorily completed.

ITEM NO. 10b ASPHALT PATCH

The Unit Price Bid for asphalt paving patch shall include all costs for furnishing labor, equipment, and materials for saw cutting, excavating, grading, preparing the subsurface, installing new stabilized aggregate base material, prime coat, asphaltic concrete binder, tack coat, and asphaltic concrete surface course as indicated on the drawings and in accordance with the specifications.

Measurement will be on a square yard basis of the asphalt patch.

Payment, at the Unit Price bid, will be full compensation for the work satisfactorily completed.

ITEMS NO. 11 BASKETBALL COURTS

The Unit Price Bid for basketball courts work shall include (but not be limited to), all cost for furnishing material, labor and equipment required for the installation of basketball courts in accordance with the drawings and specifications including detailing as shown in the drawings. The price shall include the excavation, forming and installation of basketball courts, concrete base, goals, striping, multi-colored surfacing (up to 7 colors) and all equipment necessary and any other ancillary portions of the work.

Measurement will be on a basketball court constructed, installed and completed.

Payment will be made at the Unit Price Bid measured as specified above.

ITEM NO. 12a ELECTRICAL -COORDINATION WITH DUKE ENERGY

The Lump Sum Price for this item shall include costs for coordination with Duke Energy for restroom power supply and utility relocation, to include but is not limited to power pole relocations on Oakland Street and services as shown and as directed by the Owner.

The amount to be paid under this item shall be compensation for coordination with Duke Energy.

Payment at the Unit Price Bid will be full compensation for satisfactorily electrical work installed and completed.

ITEM NO. 12b. SOLAR LIGHTING

The Unit Price Bid for solar lighting shall include all costs for furnishing all materials, labor, and equipment to install solar lighting at the location on the drawings. The Bid Price shall also

include all preparation costs, including but not necessarily limited to, excavation, grading, forming, reinforcing, compaction, and disposal of any excess materials.

Measurement will be on a lump sum basis for solar lights installed and accepted.

Payment at the Unit Price Bid will be full compensation for the work satisfactorily completed.

ITEM NO. 13a & b STRIPING AND SIGNAGE

The Lump Sum Price for this item shall include costs for pavement striping and marking, to include but is not limited to parking lines, handicap markings, directional arrows and stop lines Stop Signs, and signage on the new pavement and as shown and as directed by SCDOT and the Owner.

The amount to be paid under this item shall be compensation for furnishing the paint materials, signage and installation.

Payment at the Unit Price Bid will be full compensation for satisfactory striping and signage installed.

ITEM NOS. 14 RESTROOM BUILDING/ PAVILION

The Lump Sum Bid for structures shall include:

1. The purchase of all materials required for construction of the restroom building and pavilion as per architectural plans and specifications.
2. Structure layout as per architectural drawings & site drawings
3. All labor and equipment required to construct the restroom building pavilions.
4. Concrete floor slab and foundations as shown on the architectural and structural plans.
5. 4" Sanitary Sewer clean outs and connection to existing City of Sumter sewer tap.
6. 1-1/2" domestic water line connection to existing City of Sumter water meter.
7. Electrical Service and coordination with Duke power to bring underground service to the proposed building.
8. Coordination with City of Sumter and all utility companies associated with the improvements as shown on the plans.

Measurement will be fully completed structure and accepted.

Payment at the lump sum Bid will be full compensation for the work satisfactorily completed.

ITEMS NOS. 15 SITE FURNISHINGS WATER FOUNTAIN

The Unit Price Bid for water fountains (including water and sewer/drain connections), shall include all labor, materials, and equipment for installation of specified item per manufacturers requirements at the location shown on the Drawings, and in accordance with the Details.

Payment will be measured on a per-item basis of items installed.

Payment, at the Unit Price Bid, will be full compensation for all work satisfactorily completed.

ITEM NOS. 16. PLAYGROUND STRUCTURE & POUR IN PLACE SURFACING

The Unit Price bid for the playground structures shall include costs for furnishing all labor, equipment and materials including providing and installing the playground equipment, underdrain and Multi-colored surfacing (up to 3 colors) shown at the locations on the drawings and in accordance with the specifications.

Measurement will be on a lump sum basis for the playground equipment and adjustments to ex. equipment and square yard basis of completed playground surfacing installed.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEM NO. 17a-x PLANTING

The Unit Price bid for planting shall include costs for furnishing all labor, equipment and materials including planting mixtures for providing and installing the plant material at the locations shown on the drawings and in accordance with the specifications. The Contractor also shall include topsoil, planting mix, weed fabric and pine straw mulch in the bid price. Top soil and mulch shall be added to areas shown and labeled as mulch.

Measurement will be on an each basis for plant material installed.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEM NO. 17v FLAGSTONE

The Unit Price bid for flagstone shall include costs for furnishing all labor, equipment and materials for installing the flagstone at the locations shown on the drawings and in accordance with the specifications.

Measurement will be on an each basis for plant material installed.

Payment, at the Unit Price Bid, will be full compensation for the work satisfactorily completed.

ITEM NO. 18 IRRIGATION

The Lump Sum bid for items under irrigation shall include costs for all design, labor, equipment, and material for installing the individual items at the locations designed by the contractor in

accordance with the details and specifications. The price shall also include power to controller backflow and all necessary for installation of a working and accepted irrigation system Contractor shall design system as necessary based on flow and water pressure achieved on existing site.

Payment, at the Lump Sum Bid, will be full compensation for all work satisfactorily completed.

(End Section 01250)

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PART ONE - GENERAL:**1.1 Scope**

This work includes the demolition and removal of all items necessary for the completion of the work as shown on the contract documents, including but not limited to, asphalt base and surfacing, concrete paving, and designated vegetation.

1.2 Quality Assurance**1.2.1 Referenced Standards**

Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards. South Carolina Highway Department Standard Specifications for Highway Construction, 2007 Edition.

PART TWO - PRODUCTS: (This section not applicable).

PART THREE - EXECUTION:**3.1 Requirements**

The work includes demolition or removal of all existing materials indicated, specified or required. All materials resulting from demolition work, except as indicated or specified otherwise, shall become the property of the contractor and shall be removed from the limits of the owner's property. Remove all rubbish and debris from the site daily, unless otherwise directed.

3.1.1 Dust Control

Take appropriate action to check the spread of dust to avoid the creation of a nuisance in the surrounding area. Comply with all dust regulations imposed by local air pollution agencies.

3.1.2 Personnel

Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights to meet the SCDOT standard for traffic control.

3.2 – Existing Facilities to be Removed

3.2.1 Asphalt

Remove asphalt concrete, concrete and base materials completely where indicated within the limits as specified for the new work. Exercise extreme care in the demolition procedures to avoid damage to private and public property. The existing roadway materials are indicated on the drawings. This information is not presented as a guarantee of the material to be encountered. Contractors are to make their own determinations as to the work involved.

3.2.2 Miscellaneous Removals

Remove completely all lawn and gravel within the limits specified for the new work. Exercise extreme care in the removal procedures to avoid damage to private and public property.

3.2.3 Concrete

Where concrete work to be removed abuts concrete to remain, saw concrete along straight lines to a depth of not less than two inches (2"). The remainder of the concrete shall be broken out, provided that the broken area is concealed in the finished work, and the remaining is sound. At locations where the broken face cannot be concealed, it shall be ground smooth or the saw cut shall be made entirely through the concrete.

3.2.4 Salvaged Materials

Items to be salvaged and delivered to the City include, any and all asphalt millings, chain link and ornamental fencing, and signage in the construction limits.

3.3 – Clean Up

Remove and transport all debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent areas.

3.4 - Regulations

Comply with all Federal, State and local hauling and disposal regulations.

(End of Section 02050)

PART ONE – DESCRIPTION:

1.1 The clearing work covered by this section consists of cutting, removing and properly disposing of vegetation and debris. Trees specifically identified on the plans to be preserved shall be adequately delineated and flagged by the CONTRACTOR, such that the balance of the work may be performed in a safe and harmless manner in the vicinity of preserved trees. Such tree preservation will be considered part of the work and shall be in conformance with applicable local codes and regulations. Clearing and grubbing shall be performed in areas as called for on the plans, the limits of which shall coincide with the construction limits and in general shall extend five (5) feet beyond top of cut and toe of fill, not to exceed the limits of the Owner's property.

1.2 Related Work

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2.1 Reference the following specifications for related work:

02210 Unclassified Excavation and Grading

1.2.2 Clearing and grubbing activities shall conform to Section 201 of the "Standard Specifications for Highway Construction" dated 2007, published by the South Carolina Department of Transportation, except that grubbing shall be performed on all cleared excavation and embankment areas and shall include the complete removal of all stumps, roots and embedded debris.

1.3 The grubbing work covered by this section consists of removing and properly disposing of all surface vegetation and debris. Where the material being removed is high in organic matter content, such as root mat and other vegetative matter, it shall be considered vegetation and removed as part of the work of grubbing. Where material being removed consists predominantly of soils, such removal will be considered part of the work covered by Section 02210 of these specifications, entitled Unclassified Excavation and Grading.

1.4 The work of clearing and grubbing shall also include the removal and satisfactory disposal of crops, weeds and other annual growth, fences, steps, walls, chimneys, column footings, other footings, foundation slabs, basements, other foundation components, signs, junked vehicles, and other rubble and debris, and the filling of holes and depressions. This work shall also be performed in all non-wooded areas within the construction limits, shown on the project plans upon which seeding and mulching, sprigging or sodding is to be performed.

As a part of the work of clearing and grubbing, the CONTRACTOR will be required to cut off and plug at the right of way or construction limits, as directed by the ENGINEER, any private water or sewer line intercepted during the construction of the project, as well as cut off and remove from the construction area any septic tank or portion thereof during the construction of the project.

1.5 Clearing and grubbing operations shall be completed sufficiently in advance of grading operations as may be necessary to prevent any of the debris from the clearing and grubbing operations from interfering with the excavation or embankment operations.

1.6 The CONTRACTOR shall obtain, at his own expense, all necessary permits pertaining to clearing and grubbing work not already secured by the ENGINEER. The CONTRACTOR shall then provide a copy of any and all required permits to the ENGINEER.

PART TWO – MATERIALS:

Topsoil shall be considered to mean original surface soil, typical of the area, which is capable of supporting native plant growth, and shall be free of large stones, roots, brush, waste construction debris and other undesirable material.

PART THREE – INSTALLATION:

3.1 Clearing and grubbing shall be performed in areas as called for on the plans, the limits of which shall coincide with the construction limits and in general shall extend 5 feet beyond top of cut or toe of fill, not to exceed the limits of the OWNER's property. Clearing and grubbing activities shall conform to the “Standard Specifications for Highway Construction” dated 2007, published by the South Carolina Department of Transportation, except that grubbing shall be performed on all cleared excavation and embankment areas and shall include the complete removal of all stumps, roots and embedded debris.

3.2 The CONTRACTOR shall perform all clearing and grubbing operations before construction operations begin.

3.2.1 Where adjacent areas within the site but outside the limits of construction are disturbed as a result of clearing and grubbing activities, the CONTRACTOR shall remove all debris and restore to the original grades and equal or better condition.

3.2.2 The CONTRACTOR shall exercise caution to protect and maintain all existing utilities and underground works which are to remain. Any existing utilities or underground works which are to remain that are disturbed during construction shall be repaired or replaced at the CONTRACTOR's expense.

3.2.3 The CONTRACTOR must comply with all local, state and federal laws, ordinances and regulations in the removal and disposal of clearing and grubbing of all vegetation, timber, waste and all surface debris that must be hauled from the Project Site. No burning of materials will be allowed on site. The CONTRACTOR shall properly dispose of all cleared materials at his expense, in conformance with all applicable local and state laws and ordinances with the exception of any materials to be reused or recycled as directed elsewhere in this contract.

3.3 Stripping and Storage of Topsoil

All topsoil suitable for reuse, in the opinion of the ENGINEER, shall be stripped to its full depth, all topsoil to be moved shall be free of large stone, roots, brush, waste construction materials and other undesirable matter.

3.3.1 Topsoil stripping shall be accomplished from all topsoiled areas to be disturbed.

3.3.2 Existing lawn sods may be left to decompose with the topsoil. Heavier stands of weeds and grasses shall be removed as directed by the ENGINEER prior to the stripping operations.

3.3.3 The topsoil shall be kept separate from other excavated materials and stored in stockpiles, the location of which shall be as directed by the ENGINEER. Topsoil shall be stockpiled so that it shall not be subject to abnormal erosion and loss, and so that it does not impede the flow of drainage runoff. The directed locations of topsoil stockpiles will, when construction sequence permits, be located in areas that have previously been graded to design rough grade.

3.3.4 Any excess topsoil shall be hauled off the OWNER's property by the CONTRACTOR at CONTRACTOR expense.

(End of Section 02110)

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SECTION 02210 UNCLASSIFIED EXCAVATION AND GRADING

PART ONE – DESCRIPTION:

This portion of the project includes the excavation, undercut excavating, grading, earthwork and compaction required as shown on the plans and all other associated miscellaneous items of earthwork construction, as shown on the plans. The CONTRACTOR shall furnish all materials, labor, equipment and incidental items necessary to complete this portion of the work as detailed on the plans and as called for in these Specifications.

1.1. Any reference to standard specifications refers to the most current published date published of the following specification or regulation unless otherwise noted.

All unclassified excavation shall be in accordance the latest version of the "Standard Specifications for Highway Construction", published by the South Carolina Department of Transportation, unless otherwise directed herein.

1.2. Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted:

Reference the following specifications for related work:

02110 Clearing and Grubbing

02933 Seeding and Mulching

ASTM D698C

State Highway Specifications referred to in Section 1.1

1.3. Definitions

Trench Rock: That rock within the trenching limits that must be removed for utility construction.

Mass Rock: That rock which must be removed by blasting to permit reaching one foot below the design finish grade.

Geotechnical Engineer, also known as the "Project Geotechnical Engineer": Professional soils engineer hired by the CONTRACTOR and approved by the ENGINEER for this project.

Surveyor: Licensed surveyor hired by the CONTRACTOR and approved by the ENGINEER for this project.

PART TWO – MATERIALS:

2.1. Topsoil shall be considered to mean original surface soil, typical of the area, which is capable of supporting native plant growth, and shall be free of large stones, roots, brush, waste, construction debris and other undesirable material or contamination.

2.2. All fill used for site grading operations should consist of a clean (free of organics and debris) low plasticity soil (plasticity index less than 30).

PART THREE – INSTALLATION:

3.1. General Requirements

- 3.1.1. In the event a subsurface investigation report has been prepared for this project, all excavation, filling and grading shall be performed in accordance with the recommendations of the subsurface report, and under the direction of the project geotechnical ENGINEER.
- 3.1.2. Construction stakeout will be by a licensed survey firm provided by the CONTRACTOR. Exact locations and grade points are to be staked or fixed by the surveying firm before construction. The CONTRACTOR shall not disturb any benchmarks, reference stakes or property line monuments. In the event it becomes necessary to remove any benchmark, reference stake or property line monument in the performance of the work, the CONTRACTOR shall reference such points in preparation for replacement. If any such points are disturbed or damaged, they shall be replaced by a Registered Land Surveyor in the state where the work is located at the expense of the CONTRACTOR.
- 3.1.3. Existing utility lines (either overhead or underground), sidewalks, fencing, pavement or other structures shown on the drawings, shown to the CONTRACTOR or mentioned in the plans and specifications shall be kept free of damage by the CONTRACTOR's operations. It shall be the responsibility of the CONTRACTOR to verify the existence and location of all underground utilities within the Project Site. The omission from or the inclusion of utility locations on the plans is not to be considered as the non-existence of or a definite location of existing underground utilities. Any existing construction damaged by the CONTRACTOR shall be restored to an equal condition as that existing at the time prior to damage, at the CONTRACTOR's expense. If any existing utility is inadvertently damaged during construction, the CONTRACTOR shall notify the utility, the ENGINEER and the OWNER of said damaged utility at once so that emergency repairs may be made at the CONTRACTOR's expense and to the satisfaction of the party having jurisdiction of the utility.

3.2. Unclassified Excavation

- 3.2.1. Upon completion of the stripping operations, and after all excavation of the site has been completed to the lines and grades shown on the drawings, the exposed subgrade in cut areas should be proofrolled as specified herein for areas to receive fill. Any areas which deflect, rut or pump excessively during the proof rolling or fail to "tighten up" after successive passes should be undercut to suitable soils and replaced with compacted fill.
- 3.2.2. All site excavation shall be unclassified regardless of the nature of the materials encountered with the exception of rock excavation. Only that material which in the opinion of the ENGINEER cannot be removed with a caterpillar D-9 or equal, equipped with a properly fitted single tooth ripper, or removed by a caterpillar 225 backhoe or equal, equipped with rock teeth, will be regarded as rock. The ENGINEER should be notified immediately if rock is encountered. All excavation materials which are not

required for fills shall be considered as waste and shall be disposed of off the OWNER's property unless directed otherwise by the OWNER in writing.

- 3.2.3. All site excavation of previously stockpiled or buried construction, clearing or demolition debris or any other refuse shall be properly disposed of offsite at the CONTRACTOR's expense. The CONTRACTOR shall obtain all necessary Federal, State or Local permits for transporting and disposing of such material, at his expense.
- 3.2.4. Rock in the bottom of roadway cuts shall be excavated to a depth of 1 foot below the roadbed and ditches. Rock in building pad areas shall be excavated to a depth of 1 foot below finished grade or as indicated on the grading plans.
- 3.2.5. The CONTRACTOR shall provide all sheeting, shoring, underpinning and bracing required to hold the sides of the excavation and for the protection of all adjacent structures. The CONTRACTOR shall be held responsible for any damage to any part of the work by failure of excavated sides or bottoms.

3.3. Blasting

- 3.3.1. Any and all blasting operations shall be conducted in strict accordance with existing ordinances and regulations relative to storage and use of explosives. Blasting shall be done only by experienced men and extreme caution and care shall be exercised to prevent injury to persons or damage to any pipe, mains, wires, drains, buildings, railroad tracks or other property above or below the surface of the ground. The CONTRACTOR shall use safety nets or other equivalent measures as approved by the ENGINEER to reduce the possibility of flying rock as a result of blasting operations. The CONTRACTOR shall be held strictly responsible for any injury to persons or damage to public or private property.
- 3.3.2. The CONTRACTOR shall submit blasting plans to the ENGINEER for review and shall not proceed with blasting operations until approval has been granted. As directed by the ENGINEER, blasting operations shall be monitored to insure that vibration levels produced by blasting are within tolerable limits.
- 3.3.3. The CONTRACTOR shall obtain at his expense, all Federal, State and Local permits required to perform blasting operations.

3.4. Dewatering

- 3.4.1. The CONTRACTOR shall control the grading in all areas so that the surface of the ground will be properly sloped, diked or ditched to prevent water from entering into excavated areas. The CONTRACTOR shall maintain sufficient personnel and equipment to promptly and continuously remove all water, from any source, entering or accumulating in the excavation or other parts of the work. All water pumped or drained from these areas shall be disposed of in a suitable manner without damaging adjacent property or other work under construction.

3.5. Embankments, Fills and Backfills

- 3.5.1. Upon completion of the stripping operations, the exposed subgrade in areas to receive fill should be proofrolled with a loaded dumptruck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons, under the supervision of the geotechnical ENGINEER. The proof rolling procedure should consist of four complete passes of the exposed areas with two of the passes being in a direction perpendicular to the preceding ones. Any areas that deflect, rut or pump excessively during the proofrolling or fail to "tighten up" after successive passes should be undercut to suitable soils and replaced with compacted fill.
- 3.5.2. Embankments and fills shall be constructed at the locations and to the lines and grades indicated on the drawings. Material shall be placed in horizontal layers not to exceed 8 inches in loose depth and thoroughly compacted prior to placing each following layer. All fill material shall be free from roots or other organic material, trash, and from all stones having any one dimension greater than 6 inches. Stones larger than 4 inches, maximum dimension, shall not be permitted in the upper 6 inches of fill or embankment. Fill areas shall be kept level with graders or other approved devices.
- 3.5.3. Embankment and fill compaction shall be accomplished by thoroughly compacting each layer with sheep foot rollers, pneumatic rollers, and mechanical tampers in places inaccessible to rollers, or other equipment. When material has too much moisture, grading operations shall be limited to drying soil by spreading and turning for drying by the sun and aeration. When material is dry, moisture shall be added by sprinkling by approved means.
- 3.5.4. All embankments and fills shall be compacted to the following percentages of the maximum dry density as determined by the Standard Proctor Density Test, ASTM D-698, Method C.
- 3.5.5. The following table shall be used unless otherwise specified:

TABLE OF COMPACTION

Type Fill or Embankment	Zone	Minimum Density %
Structure	All Depths	98
Roadway & Sidewalks	Top 12 Inches	98
Other Areas	Remainder	95

Embankment types are defined as follows:

- Structure - beneath concrete slabs of buildings, floors, foundations, etc.
- Roadway and Parking - beneath all roads, streets, truck operations, and automobile parking lots

- 3.5.6. Where backfilling is required after the completion of drainage structures, all forms, trash, and construction debris shall be removed from excavation before backfilling begins. Backfill shall be placed in horizontal layers of 6 inches in loose depth. Compaction shall conform to requirements in the above table. Heavy rollers, crawler equipment, trucks or other heavy equipment shall not be used for compacting backfill within 5 feet of structure

walls or other facilities which may be damaged by their weight or operation. No backfilling shall begin until concrete and masonry walls are properly cured.

3.5.7. The CONTRACTOR shall carry the top of embankments, fills, or backfills to the surrounding grade so that upon compaction and subsequent settlement, the grade will be at proper elevation. Should settlement occur during the guarantee period of the contract, the CONTRACTOR shall provide sufficient fill to bring area up to finished grade and shall reseed as required.

3.6. Proof rolling Schedule

3.6.1. Proof rolling under the observation of the geotechnical ENGINEER will be performed using a loaded dumptruck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons as specified herein and as follows.

3.6.2. Immediately following stripping, all areas to receive fill shall be proofrolled as specified herein.

3.6.3. Immediately following the completion of excavation to proposed grades in cut areas, proof rolling shall be performed as specified herein.

3.6.4. Immediately prior to stone base course placement in pavement areas and following final floor slab preparation, all subgrade areas will be proofrolled. Any local areas that deflect, rut or pump under the roller shall be undercut and replaced with compacted fill material as specified herein.

3.7. Soil Inspection and Tests

3.7.1. All excavated and fill material shall be removed, selected, placed and compacted under supervision of a representative of a commercial soils testing laboratory which will be selected by the CONTRACTOR and approved by the ENGINEER. A commercial soil testing laboratory shall be any firm properly equipped to perform such compaction tests and who has in their employment a Professional ENGINEER experienced in testing and soil mechanics. The laboratory representative shall have the authority to approve or disapprove the condition of the subgrade on which fill is to be placed, filled material, placement methods, compaction methods, and shall make compaction density tests as necessary to determine that the specified density is obtained. The CONTRACTOR shall notify the laboratory at least three (3) days prior to starting fill operations in order that suitability of material for compaction may be checked and no material shall be used that has not been previously checked and approved by the laboratory. The laboratory shall be notified before any cut is made or fill is placed in order that the laboratory representative may be present during all grading operations. The CONTRACTOR shall remove, replace, recompact and retest all fills failing to meet the density requirements at his own expense.

3.7.2. A soil testing laboratory shall be retained by the CONTRACTOR and approved by the ENGINEER to supervise fill placement and compaction. Extra time and trips caused by excessive delay, failure of the CONTRACTOR to properly coordinate with the

laboratory, or failure of the CONTRACTOR to properly compact fill material shall be the responsibility of the CONTRACTOR.

- 3.7.3. Field density tests shall be performed by the OWNER's testing agency for each one foot of fill material placed at the following frequency: once per day.
- 3.7.4. A minimum of one field density test shall be made for each 5,000 square feet of fill placement in building areas.
- 3.7.5. A minimum of one field density test shall be made for each 10,000 square feet of fill placement in all other areas where pavement is to be placed.
- 3.7.6. Prior to final acceptance, the Soils ENGINEER and Surveyor shall submit certification specifying that the project compaction criteria and subgrading elevations have been satisfactorily obtained. The CONTRACTOR is responsible for the certification statement from the Surveyor. This certification should be in the form of a letter accompanied by a stamped as-built drawing showing spot elevations.

3.8. Borrow and Waste Materials

3.8.1. Borrow

In the event borrow material is required, the borrow material shall be checked for suitability for compaction and approved by the soils testing laboratory. The CONTRACTOR shall notify the laboratory at least three (3) days in advance of beginning borrow operations. Borrow excavation shall be performed in accordance with referenced State Highway construction Specification in which state the project is located except where modified herein.

3.8.2. Waste

Excavated materials not suited for backfill and excavated material in excess of that needed to complete the work shall be wasted on the project site where directed by the ENGINEER or hauled off the OWNER's property at the CONTRACTOR's expense. Waste areas shall be left in a graded and sloped condition to allow natural drainage of surrounding area.

3.9. Residual Soil Areas

If proof rolling indicates that on-site virgin soils supporting any roadway, parking, building or other structural areas are not adequate as determined by the Soils ENGINEER, then these unsuitable areas shall be repaired by the CONTRACTOR. The necessary repair procedure shall be determined by the Soils ENGINEER and may include scarifying, drying and recompaction procedures or undercutting and replacement procedures.

3.10. Final Grading

- 3.10.1. On completion of all grading, all graded areas (except building pads and pavement areas in rough grading contracts and all cut slopes steeper than 4:1 slope) shall be provided with 4 inches of topsoil and brought to the finished grades shown on the drawings. Areas

disturbed by operations of the CONTRACTOR shall be properly returned to their original condition with a topsoil covering of 4 inches.

3.10.2. After the entire graded area has been brought to the finished grades shown on drawings, all areas shall be left smooth and free from erosion, ridges, ditches and evidence of ponding. Final grades shall be free from all roots, debris, rock and soil lumps and left in readiness for seeding.

3.10.3. Prior to acceptance of the entire project, the CONTRACTOR shall correct all embankments and graded areas of all damages due to washes, settlement, erosion, equipment ruts or any other cause at his expense.

3.10.4. Prior to final acceptance, the CONTRACTOR shall provide certification as specified in paragraph 3.7.6 that all grades are + .1 foot of the finished grades shown on project drawings.

3.10.5. The CONTRACTOR shall stabilize all disturbed areas, unless otherwise directed, by seeding and mulching per section 02933 of these specifications or other means of stabilization called for by the contract drawings.

3.11. Clean-Up

Upon completion or termination of the work, and before final payment is made, the CONTRACTOR shall remove from site all equipment, waste materials and rubbish resulting from his operations. In the event of his failure to do so, the same may be done by the OWNER at the expense of the CONTRACTOR.

(End of Section 02210)

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SECTION 02222 EXCAVATING, BACKFILLING & COMPACTING FOR UTILITIES

PART 1 DESCRIPTION

The CONTRACTOR shall furnish all labor, material, equipment, and supplies, and shall perform all earthwork including excavation and backfill, pavement removal, sheathing, bracing, shoring, pumping or bailing, dewatering, restoration and cleanup, all as indicated, specified and/or necessary to complete the work.

1.1 Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2 RELATED WORK

Reference the following Specifications Sections for related work:

02270	Erosion and Sediment Control
02933	Seeding and Mulching
03300	Cast-in-Place Concrete

Reference the following National Specifications for related work:

D-2487	ASTM Uniform Soil Classification System, 1991 (US Army Corp of Engineers Standard as revised by the US ACE and the Bureau of Reclamation in 1952)
D-698	ASTM Compaction Testing
P-1926	OSHA Regulations

1.2. REFERENCES

1.2.1 Any reference to Standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless otherwise noted.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

1.2.2. Any reference to SCDOT standard specifications was obtained from the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

PART TWO – MATERIALS:

2.1 Fill Material shall be classified as ML-low plasticity silt or better by the Unified Soil Classification System and tabulated below:

Unified Class	Description
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Class I		1/4" - 1-1/2" well graded stone including coral, slag, cinders, crushed stone and crushed shells
Class II	GM	Coarse gravel well graded
	GP	Coarse gravel poorly graded
	SW	Coarse sands well graded
	SP	Coarse sands poorly graded
Class III	GM	Silty-sandy gravel
	GC	Clayey-sandy gravel
	SM	Silty-sands
	SC	Clayey-sands
Class IV	ML	Inorganic silts and fine sands

Fill material shall exhibit a plasticity index of less than 20 and Standard Proctor maximum density at optimum moisture greater than 90 pounds per cubic foot.

The following materials are unacceptable

	Unified Class	Description
Class IV	CL	Inorganic clays - low plasticity
	MH	Inorganic elastic silts
	CH	Inorganic clays - high plasticity
Class V	OL	Organic silts
	OH	Organic clays
	PT	Highly organic soil

2.2 WASHED STONE

Stone material where indicated shall be crushed stone or gravel of strong, durable nature and shall conform to standard size No. 57 stone in SCDOT Appendix 6:

1 1/2"	100%
1"	95-100%
1/2"	25-60%
#4	0-10%
#8	0-5%

2.3 CLASS C CONCRETE

Minimum 28-day compressive strength of 2000 psi.

PART 3 CONSTRUCTION

3.1 EXISTING FACILITIES

3.1.1 Existing Utilities Shown on the Drawings

It shall be the CONTRACTOR's responsibility to conduct the work in such a manner as to avoid damage to or interference with any utilities services shown on the drawings. If such damage, interference, or interruption of service shall occur as a result of his work, then it shall be the CONTRACTOR's responsibility to promptly notify the ENGINEER of the occurrence and to repair or correct it immediately, at his own expense, and to the satisfaction of the ENGINEER and the OWNER of the Utility.

3.1.2 Existing Utilities Not Shown on the Drawings

It shall be the CONTRACTOR's responsibility to exercise all reasonable precaution in the performance of the work to avoid damage to or interference with any utilities services, even though not shown on the drawings. If such damage, interference, or interruption of service shall occur as the result of this work, then the CONTRACTOR's responsibility will be the same as stipulated in Paragraph 3.1.1 above.

3.2 EXCAVATION AND BACKFILL - General Requirements

3.2.1 Pavement, gutters, sidewalks, aprons and curbs which will be disturbed by excavation shall be removed and disposed of as a part of ordinary excavation. That which is to be removed shall be cut or sawn along clean straight lines from that which is to remain. Remove enough such that a minimum of twelve inches of undisturbed earth remain between the excavation and that which is to remain.

3.2.2 Where required, and as approved by the ENGINEER, sheeting and bracing shall be used to prevent injury to persons, caving of trench walls and to conform with all governing laws and ordinances. Sheeting and bracing shall be left in place until the trench is refilled to a safe limit. The top portion may then be removed, but the lower portion shall remain undisturbed.

3.2.3 It is the responsibility of the CONTRACTOR to provide an adequate dewatering system where required. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is completed or as otherwise directed by the ENGINEER. All damage resulting from the dewatering operation shall be repaired by the CONTRACTOR to the satisfaction of the ENGINEER and at no cost to the OWNER.

3.3 The CONTRACTOR shall erect, maintain, and safeguard temporary bridges, walkways, or crossings where it is necessary to maintain traffic. Where trenches are open in the vicinity of pedestrian or vehicular travel lanes, suitable carriers will be constructed and maintained and the work will be further protected from sunset to sunrise with a sufficient number of lights or flares to fully protect the public from accidents on account of construction.

3.4 If the specified depth for foundations proves insufficient to reach firm ground, the ENGINEER shall be notified and will furnish instructions for proceeding with the work.

3.5 ROCK, wherever used as a name for excavation material, shall mean boulders exceeding one-half cubic yard in volume or solid ledge rock, which in the opinion of the ENGINEER, requires for its removal drilling and blasting, or wedging or sledging and barring. Where rock excavation is necessary, the CONTRACTOR shall excavate the same as near the neat lines of the trench as practicable and he shall take all due precautions in the pursuance of the work. He will be held strictly responsible for all injury to life and to public and private property.

3.5.1 Rock shall be removed from the excavation to the following limits:

3.5.1.1 Trenches - The diameter of the pipe plus 8-inches on each side, extending six inches below the pipe wall and bell.

3.5.1.2 Structures - 12-inches beyond the vertical plane of the structure on all sides and on the bottom only to the depth necessary for proper installation.

3.6 BLASTING

Prior to commencing any blasting operations the CONTRACTOR shall notify the ENGINEER and either the Local Fire Department - Fire Prevention Section or the County Fire Administrator (as applicable) and obtain blasting permits as required. Blasting must be done by a licensed blaster. Blasting and magazine permits must be obtained from the South Carolina Department of Labor, Licensing, and Regulation. The CONTRACTOR must furnish proof (certification) of insurance specifically covering any and all obligations assumed pursuant to the use of explosives.

All blasting operations shall be conducted in strict accordance with any and all decrees, rules, regulations, ordinances, laws as may be imposed by any regulatory body and/or agency having jurisdiction over the work relative to handling, transporting, use and storage of explosives. Blasting shall be done only by competent and experienced men whose activities shall be conducted in a workmanlike manner. Satisfactory information must be provided to the ENGINEER, that the blaster meets or exceeds the qualifications enumerated in OSHA Regulations Part 1926, Subpart U, Section 1926.901 - Blaster Qualifications.

The CONTRACTOR shall protect all structures from the effects of the blast and repair any resulting damage. If the CONTRACTOR repeatedly uses excessive blasting charges or blasts in an unsafe or improper manner, the ENGINEER may direct the CONTRACTOR to employ an independent blasting consultant to supervise the preparation for each blast and approve the quantity of each charge.

3.6.1 Overburden

Undisturbed overburden may be deemed adequate in lieu of matting but only after the actual depth of the undisturbed overburden has been determined and adjudged sufficient by the ENGINEER. Under no circumstances will loose or fill overburden be adequate without the use of weighted mats.

3.6.2 Permission to Blast

The CONTRACTOR shall not be allowed to blast before 9 a.m. or after 3 p.m. without approval of the ENGINEER and OWNER. Blasting will not occur within any rights-of-way maintained by any agency (D.O.T., R.R., Gas, OWNER, etc.) without specific approval of the controlling agency and only in accordance with their respective requirements (as exceeded herein). The CONTRACTOR shall be held responsible for any and all injury to persons or damage to public or private property.

3.6.3 The CONTRACTOR shall not use excavated rock as backfill material. Dispose of rock which is surplus or not suitable for use as rip rap.

3.6.4 Monitoring

The CONTRACTOR shall notify the ENGINEER prior to any blasting. Additionally, the CONTRACTOR shall notify the ENGINEER before any charge is set. Following review by the ENGINEER regarding the proximity of permanent structures to the blasting site, the ENGINEER may direct the CONTRACTOR to employ an independent, qualified specialty Sub-Contractor, approved by the ENGINEER, to monitor the blasting by use of seismograph, identify the areas where light charges must be used, conduct pre-blast and post-blast inspections of structures, including photographs or videos, and maintain a detailed written log.

3.7. **STRUCTURE EXCAVATION AND BACKFILL**

3.7.1 Structure Excavation shall be made at the locations shown on the plans and to the exact subgrade required. Bottom of excavations shall be level and in firm, solid material, with soft material or voids treated as specified. Excavated areas shall be kept free of water during the construction period. Where earth will stand, footing trenches may be cut to the exact size of the footings; otherwise, forms shall be used. Where necessary, sides of excavations shall be shored and sheathed, or cofferdams built, as required for protection of the work and personnel.

3.7.1.1 Wherever excavation for a foundation extends below the water table or where specifically indicated on the plans, washed stone shall be placed to a minimum thickness of 12 inches, unless otherwise shown, prior to placing the foundation. The washed stone shall be compacted to 90% of maximum as determined by the Standard Proctor test (ASTM D698).

3.7.1.2 If the specified depth for foundations proves insufficient to reach firm ground, the ENGINEER shall be notified for furnishing instructions and proceeding with the work.

3.7.1.3 An adequate dewatering system shall be provided at all structure excavations and elsewhere as directed by the ENGINEER. If a well-point system is used, the CONTRACTOR shall submit plans to the ENGINEER for approval. The system shall be capable of removing any water that accumulates in the excavation and maintaining the excavation in a dry condition while construction is in progress. The surface of the ground shall be sloped away from the excavation or piping provided to prevent surface water from entering the excavation. Disposal of water resulting from the dewatering operation shall be done in a manner that does not interfere with normal drainage, and does not cause damage to any portion of the work or adjacent property. All drains, culverts, storm sewers and inlets subject to the dewatering operation shall be kept clean and open for normal surface drainage. The dewatering system shall be maintained until backfilling is complete or as otherwise directed by the ENGINEER. All damage resulting from the dewatering operation shall be repaired by the CONTRACTOR to the satisfaction of the ENGINEER and at no cost to the OWNER.

3.8. Structure Backfill shall be done with material free from large clods, frozen earth, organic material or any foreign matter, and shall evenly and carefully be placed and tamped in horizontal layers. Compaction equipment specifically designed for these purposes must be present and operational at the job site and shall be utilized throughout to obtain uniform compaction. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698), with compaction requirements as follows:

<u>Percent of Maximum Density at Optimum Moisture</u>	<u>Location</u>
100	Top 12" of fill for pavement or surfacing
95	Full depth beneath all roads (paved or unpaved), driveways, sidewalks, undercut backfill for structure excavation, and lots
95	All other areas not defined above

3.8.1 No backfill shall be placed against a structural wall until all connecting structural members are in place. It shall be the CONTRACTOR's responsibility to provide compaction to such a degree that subsidence after placing shall not be detrimental to the stability or appearance of the structure, adjacent ground, or paved areas. The CONTRACTOR shall provide adequate protection to all structures during backfilling and shall use every precaution to avoid damaging or defacing them in any way. CONTRACTOR shall be responsible for the protection of all structures from damage or flotation prior to backfill being placed.

3.8.2 Unless otherwise approved by the ENGINEER, liquid-retaining structures shall not be backfilled until tested for leakage.

3.9. UNSTABLE SUBGRADE

Should unstable soil, organic soil, or soil types classified as fine-grained soils (silts and clays) by ASTM D-2487 be encountered in the bottom of pipe trenches or structure excavations, such soils shall be removed to a depth and width determined by the ENGINEER, properly disposed of and shall be backfilled with crushed stone conforming to the Department of Transportation Specifications, Size 57. Placement shall not exceed 12-inches loose and compacted to 90% of the dry density determined by the Standard Proctor Test ASTM D698 (Class C concrete may be substituted in place of #57 stone at the CONTRACTOR's option. A 24-hour cure must be given before proceeding with the work).

3.10. SITE GRADING

Site grading shall conform to the grades indicated by the finish contours on the plans. Where topsoil, pavement, gravel or crushed stone surfacing and other items are shown, rough grade shall be finished to such depth below finish grade as necessary to accommodate these items. All areas where structures are to be built on fill shall be stripped to such depth as necessary to remove turf, roots, organic matter and other objectionable materials.

3.10.1 Excavation shall be made to the exact elevations, slopes and limits shown on the plans. Material excavated may be used as fill material as long as it meets the material requirements established herein. Acceptable material must be stockpiled neatly onsite and clear of all unsuitable materials to be removed from the site.

3.10.2 Fill shall incorporate only acceptable materials defined herein. It shall not contain organic material, roots, debris or rock larger than 6 inches in diameter.

3.10.2.1 Where fill is to be placed, all existing vegetation, roots and other organic matter down to 12 inches below grade shall be stripped and disposed of as directed.

3.10.2.2 After clearing existing vegetation, at the ENGINEER's discretion, the site may require proof rolling to insure that all unstable material has been removed. Proof rolling shall be done in the ENGINEER's presence, utilizing a loaded dump truck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons.

3.10.2.3 Fill shall be placed in successive compacted layers not to exceed 6 inches compacted thickness. Each layer shall be spread evenly and compacted as specified below before the next layer is placed.

3.10.2.4 Rock shall not be incorporated in fill sections supporting pavement or structures.

3.10.2.5 Where natural slopes exceed 3:1, horizontal benches shall be cut to receive fill material. Slopes of less than 3:1 and other areas shall be scarified prior to placing fill material.

3.10.2.6 Borrow material, as required, shall be provided by the CONTRACTOR at his own expense. Borrow material on site may be utilized provided it complies with these specifications.

3.11. **COMPACTION**

Unless otherwise noted, each layer of fill and backfill and the top 12 inches of existing subgrade material in cuts shall be compacted by approved equipment as specified below. The degree of compaction and the density shall be determined by the Standard Proctor Test (ASTM D698).

	Percent of Max. Dry Density at Optimum Moisture Content
Top 12 inches of fill under pavement or surface	95%
Fill under roads and structures	95%
Fill and backfill in other areas	95%

Material too dry for proper compaction shall be moistened by suitable watering devices, turned and harrowed to distribute moisture, and then properly compacted. When material is too wet for proper compaction, operations shall cease until such material has sufficiently dried.

3.12. **COMPACTION TESTS**

The OWNER shall provide compaction tests by an independent testing agency selected by the OWNER and approved by the ENGINEER. CONTRACTOR to coordinate with independent testing agency for tests. The compaction tests shall be taken at appropriate locations and frequency to demonstrate that the backfill (or fill) has been placed to meet the minimum compaction density required. The testing agency shall submit written test records to the ENGINEER for all compaction tests performed. Minimum testing shall be one test per 500 CY of material placed at the ENGINEER's option and one test per 10,000 square feet of fill placed for every foot of fill thickness.

In the event that the soil compaction is not in compliance with these specifications, then the CONTRACTOR shall take corrective action, at no cost to the OWNER, to compact the soils within the limits of the specifications. The ENGINEER shall be notified within 24 hours of any failing compaction tests. Any retesting of failed areas shall be performed only after corrective measures have been made by the CONTRACTOR to bring the compacted soils into compliance. All retesting shall be performed with the ENGINEER present.

3.13. SITE RESTORATION

3.13.1 General

All surfaces disturbed by the CONTRACTOR in the work shall be restored to a condition equal to or better than that which existed prior to commencement of the work, except as otherwise specified herein.

3.13.2 Pipe drains, headwalls, catch basins, curbs and gutters, and all incidental drainage structures shall be restored using like materials and details at no additional cost to the OWNER. The CONTRACTOR shall maintain drainage during construction.

3.13.3 All cuts, fills and slopes shall be neatly dressed off to the required grade or subgrade, as indicated on the plans.

3.13.4 Grassed areas shall be restored at no additional cost to the OWNER. Disturbed areas shall be covered with two (2) inches of topsoil, furnished by the CONTRACTOR from an approved source and of approved quality, then shall be fertilized, and seeded to match existing adjoining areas. All ditches shall be restored to their existing grade, line and cross section.

(End of Section 02222)

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PART 1 DESCRIPTION:

The work covered by this section consists of the preparation, shaping and compaction of either an un-stabilized or stabilized subgrade, suitable for placement of base course, pavement and shoulders or for the placement of structures as called for on the plans. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.1 RELATED WORK

Any reference to standard specifications refers to the most current published date published of the following specification unless otherwise noted.

1.1.1. Reference the following specifications for related work:

Section 02200 Earthwork
ASTM C977
AASHTO T26
AASHTO T-99

Subgrade work shall conform to the "Standard Specifications for Roads and Structures" latest edition, published by the South Carolina Department of Transportation.

PART 2 MATERIALS**2.1. WATER**

Water shall be clean and free from oil, salt, acid, alkali, organic matter or other substances detrimental to the finished product. Water shall not contain more than 100-PPM chlorides or more than 500 PPM dissolved solids, and shall have a pH in the range of 4.5 to 8.5.

2.1.1. Water from a city water supply may be accepted without being tested. Water from other sources shall be tested in accordance with AASHTO T26, unless the requirement for testing is waived by the ENGINEER. The cost of testing water shall be paid by the CONTRACTOR.

2.2. LIME

Quicklime and Hydrated Lime for soil stabilization shall meet the requirements of ASTM C977 except that it shall contain a minimum of 90 percent available calcium oxide (CaO) on an LOI-free basis.

2.2.1. Hydrated Lime shall have a minimum of 85 percent passing a No. 200 sieve.

2.2.2. Quicklime shall meet one of the following gradation requirements.

"A" Gradation (% Passing)	"B" Gradation (% Passing)
3/4 in. Sieve - 100%	No. 6 Sieve 100%
1/8 in. Sieve - 0% to 5%	

2.2.3. The CONTRACTOR shall furnish material certifications with each shipment of lime attesting that the lime meets the requirements of the specifications; however, the material shall be subject to inspection, test or rejection by the ENGINEER at any time.

2.3. STABILIZER AGGREGATE

Stabilizer Aggregate shall consist of crushed stone or gravel or other similar material having hard, strong, durable particles free of adherent coatings.

STABILIZER AGGREGATE GRADATION ACCEPTANCE CRITERIA

Column A Sieve Size	Column B % Passing	
1½"	98 - 100	
1"	60 - 100	
½"	36 - 84	
No. 4	21 - 61	
No. 10	10 - 50	
No. 40	0 - 13	0 - 34
No. 200	0 - 13	
Material Passing No. 40 Sieve		
L.L.	0 - 30	
P.I.	0 - 6	

PART 3 INSTALLATION

3.1 GENERAL REQUIREMENTS

All subgrade preparation shall be in conformance with local and state Department of Transportation requirements.

3.1.1 The subgrade for roadways and structures shall be shaped to conform to the lines, grades and typical sections shown on the plans or established by the ENGINEER. All vegetation, organic matter or other deleterious material shall be removed and properly disposed of by the CONTRACTOR. Nor shall the soil contain stone or gravel larger than 2 inches for the full depth of the specified subgrade thickness. In areas where the subgrade is to be stabilized with aggregate, the subgrade surface may be left uniformly below grade to provide for the addition of the stabilizer aggregate.

3.1.2 All material to a depth of 12 inches below the finished surface of the subgrade shall be compacted to at least 98% of the soil's Standard Proctor maximum dry unit weight.

3.1.3 A tolerance of plus or minus 0.1+ foot from the established grade will be permitted after the subgrade has been graded and compacted to a uniform surface.

3.2 PROOF ROLLING

The subgrade for roads, parking areas and other locations designated on the plans or by the ENGINEER shall be proof rolled in accordance with local and state Department of

Transportation requirements, to test for stability and uniformity of compaction. The subgrade shall be proof rolled in the presence of the ENGINEER, the OWNER'S independent testing agency or his designee using a loaded dump truck or similar pneumatic-tired vehicle with a minimum loaded weight of 25 tons. Any area of the subgrade which pumps or ruts excessively shall be considered unsatisfactory and shall be windrowed and dried or shall receive lime or aggregate stabilization as directed by the ENGINEER. The subgrade shall then be recompacted and proof rolled at no additional cost to the OWNER, repeating the above-outlined process until a stable, unyielding and uniformly compacted subgrade is provided.

3.3 LIME STABILIZED SUBGRADE

Where the existing soil is incapable of providing adequate foundation for roadways or structures or where called for on the plans, the subgrade may be stabilized using lime. The treatment of subgrade soils with lime shall be in conformance with local and state Department of Transportation requirements.

3.4 AGGREGATE STABILIZED SUBGRADE

Where the existing soil is incapable of providing adequate foundation for roadways or structures or where called for on the plans, the subgrade may be stabilized using aggregate. The treatment of subgrade soils with aggregate shall be in conformance with local and state Department of Transportation requirements.

(End of Section 02231)

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PART 1 DESCRIPTION:

The work covered by this section consists of the construction of a base composed of an approved aggregate material delivered, placed, compacted and shaped to conform to the lines, grades, depths and typical sections shown on the plans or established by the ENGINEER.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.1.1. Reference the following specifications for related work:

Section 02231

Subgrade

AASHTO T-180

COMPACTION

1.1.2. Aggregate Base Course work shall conform to the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

PART 2 MATERIALS**2.1 General Requirements**

Aggregate base course material shall consist of crushed stone, crushed or uncrushed gravel or other similar material having hard, strong, durable, particle free of adherent coatings.

PART 3 INSTALLATION:**3.1 GENERAL REQUIREMENTS**

The subgrade shall be prepared as called for on the plans in accordance with Section 32 1216.1 of these specifications prior to placement of the base material.

3.1.1 The aggregate material shall be placed on the subgrade with a mechanical spreader capable of placing the material to a uniform loose depth without segregation except that for areas inaccessible to a mechanical spreader, the aggregate material may be placed by other methods approved by the ENGINEER.

3.1.2 Where the required compacted thickness of base is 8 inches or less, the base material may be spread and compacted in one layer. Where the required compacted thickness is more than 8 inches, the base material shall be spread and compacted in 2 or more approximately equal layers. The minimum compacted thickness of any one layer shall be approximately 4 inches.

3.1.3 Each layer of material shall have been sampled, tested, compacted and approved prior to placing succeeding layers of base material or pavement.

3.1.4 No base material shall be placed on frozen subgrade or base.

3.1.5 Base course which is in place on November 15 shall have been covered with a subsequent layer of pavement structure or with a sand seal. Base course which has been placed between November 16 and March 15, inclusive, shall be covered within 7 calendar days with a subsequent layer of pavement structure or with a sand seal.

3.1.6 Failure of the CONTRACTOR to cover the base course as required above will result in the ENGINEER notifying the CONTRACTOR in writing to cover the base course with a sand seal and to suspend the operations of placing aggregate base course until such cover has been placed. This work shall be performed by the CONTRACTOR at no cost to the OWNER. In the event that the CONTRACTOR fails to apply the sand seal within 72 hours after receipt of such notice, the ENGINEER may proceed to have such work performed with other forces and equipment. The cost of such work performed by the other forces will be deducted from monies due or to become due the CONTRACTOR. The application of the sand seal by the CONTRACTOR or by others will in no way relieve the CONTRACTOR of the responsibility to maintain or repair the damaged base or subgrade, no matter what the cause of damage, at no cost to the OWNER.

3.1.7 No traffic shall be allowed on the completed base course other than necessary local traffic and that developing from the operation of essential construction equipment as may be authorized by the ENGINEER. Any defects that develop in the completed base or any damage caused by local or construction traffic shall be acceptably repaired at no cost to the OWNER.

3.1.8 The CONTRACTOR shall utilize methods of handling, hauling and placing which will minimize segregation and contamination. If segregation occurs, the ENGINEER may require that changes be made in the CONTRACTOR's methods to minimize segregation, and may also require mixing on the road which may be necessary to correct any segregation. No additional compensation will be allowed for the work of road mixing as may be required under this provision. Aggregate which is contaminated with foreign materials to the extent that the base course will not adequately serve its intended use will be removed and replaced by the CONTRACTOR at no additional cost to the OWNER.

3.2 SHAPING AND COMPACTING

Within 48 hours after beginning the placing of a layer of the base, the CONTRACTOR shall begin machining and compacting of the layer. Each layer shall be maintained to the required cross section during compaction and each layer be compacted to the required density prior to placing the next layer. Testing by OWNER's independent testing agency.

3.2.1 Each layer of the base shall be compacted to at least 100% of the Modified Proctor maximum, dry unit-weight of that obtained by compacting a sample of the material.

3.2.2 The base material shall be compacted at a moisture content which is approximately that required to produce a maximum density indicated by the above test method. The CONTRACTOR shall dry or add moisture to the material when required to provide a uniformly compacted and acceptable base.

3.2.3 The final layer of base material shall be shaped to conform to the lines, grades and typical sections shown on the plans or established by the ENGINEER. When completed, the base

course shall be smooth, hard, dense, unyielding and well bonded. A broom drag may be used in connection with the final finishing and conditioning of the surface of the base course.

3.2.4 After final shaping and compacting of the base, the ENGINEER will check the surface of the base for conformance to the grade and typical section and determine the base thickness.

3.2.5 The thickness of the base shall be within a tolerance of plus or minus 0.1 feet of the base thickness required by the plans. The maximum differential between the established grade and the base within any 100 foot section shall be 0.1 feet.

3.2.6 Where the base material is placed in a trench section, the CONTRACTOR shall provide adequate drainage through the shoulders to protect the subgrade and base until such time as the shoulders are completed.

3.2.7 The CONTRACTOR shall maintain the surface of the base by watering, machining, and rolling or dragging when necessary to prevent damage to the base by weather or traffic.

3.2.8 Where the base or subgrade is damaged, the CONTRACTOR shall repair the damaged area; reshape the base to required lines, grades and typical sections, and re-compact the base to the required density at no cost to the OWNER.

(End of Section 02235)

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PART 1 DESCRIPTION

1.1. Erosion and sedimentation control shall be provided by the CONTRACTOR for all areas of the site denuded or otherwise disturbed during construction. The CONTRACTOR shall be responsible for all installation, materials, labor, and maintenance of erosion and sediment control devices, as well as removal of temporary erosion and sediment control devices shown on the plans or required to protect all downstream properties, natural waterways, streams, lakes, ponds, catch basins, drainage ditches, roads, gutters, natural buffer zones, and man-made structures.

1.2. Erosion and sediment control procedures and facilities shall conform to all legally regulated procedures for the control of erosion and sedimentation.

1.3. RELATED WORK

See the following sections for related work.

02271	Engineering Fabrics
02275	Stone for Erosion Control
02277	Temporary Silt Fence
02933	Seeding and Mulching

1.4 REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

1.5 SPECIAL REFERENCES

Erosion and sediment control procedures and facilities shall conform to the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation and South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Bureau of Water, SC Department of Health and Environmental Control.

PART 2 MATERIALS

2.1. Washed stone to be used in temporary sediment basins shall be of strong, durable nature, resistant to weathering and shall be graded to conform to local and state Department of Transportation requirements.

2.2. Refer to other sections within these specifications as listed in Item 1.3 above for other material specification required in the installation of erosion and sediment control facilities.

PART 3 INSTALLATION

3.1 GENERAL REQUIREMENTS

3.1.1 The CONTRACTOR shall follow the erosion control construction sequence schedule as shown on the contract drawings, except that should circumstances dictate that extra precaution be taken to prohibit erosion and sedimentation on the project, the CONTRACTOR will, at his own expense, take preventative measures as needed.

3.1.2 The CONTRACTOR is required to maintain all erosion and sediment control facilities to insure proper performance throughout the construction phase and until such time all disturbed areas are permanently stabilized.

3.1.3 Upon completion of construction or successful permanent stabilization of all areas which were disturbed before or during construction operations or as indicated on the construction drawings, whichever occurs last, the CONTRACTOR shall remove all temporary erosion and sediment control devices and facilities from the project site. The CONTRACTOR shall retain these items for future use or properly dispose of these items offsite.

3.1.4 The CONTRACTOR shall provide temporary or permanent ground cover as called for on the construction plans within thirty (30) working days after disturbance of any areas on the site.

(End of Section 02270)

SECTION 02271 - ENGINEERING FABRIC

PART 1 DESCRIPTION:

The work covered by this Section consists of the installation of an acceptable engineering fabric (filter fabric) appropriate for the application(s) called for on the plans or as required by field conditions. Placement of the fabric shall be an integral function of the construction of shoulder drains, subsurface drainage systems, temporary silt fences and placement of erosion control stone or rip rap facilities. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.1.1 Reference the following specifications for related work:

02270	Erosion Control
02275	Stone for Erosion Control
02277	Silt Fence

1.1.2. The filter fabric shall conform to all of Section 815 of the “Standard Specifications for Highway Construction” dated 2007, published by the South Carolina Department of Transportation and the South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Water Bureau, South Carolina Department of Health and Environmental control.

PART 2 MATERIALS

Engineering fabric shall have material properties strictly conforming to those specified in Sections of the standard State Department of Transportation specifications. The CONTRACTOR shall provide engineering fabric(s) for various applications which meet or exceed the corresponding criteria for each different fabric utilized per the subject specification.

PART 3 INSTALLATION

3.1 GENERAL REQUIREMENTS

3.1.1 Engineering fabric installed under erosion control stone or rip rap shall be placed at locations, to the dimensions as shown on the plans or as directed by the ENGINEER.

3.1.2 Surfaces to receive filter fabric shall be graded to the lines and grades as shown on the plans, unless otherwise directed by the ENGINEER. The surface shall be free of obstructions, debris and pockets of soft or low-density material.

3.1.3 At the time of installation, the fabric shall be free of defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage.

3.1.4 The filter fabric shall be laid smooth and free from tension, stress, folds, wrinkles, or creases. Horizontal overlaps shall be a minimum of 12 inches with the upper fabric overlapping the lower fabric. Vertical overlaps shall be a minimum of 18 inches with the upstream fabric overlapping the downstream fabric. In the event that the fabric is displaced or damaged during stone placement, the stone shall be removed and the fabric repositioned or replaced prior to replacement of the stone, all at no additional cost to the OWNER.

3.1.5 The placement of the filter fabric and stone shall be performed in a continuous manner as directed by the ENGINEER. The filter fabric shall be protected from damage due to the placement of stone or other materials by limiting the height of drop of the material or by placing a cushioning layer of sand on top of the fabric before dumping the material.

3.1.6 No more than 72 hours shall elapse from the time the fabric is unwrapped to the time the fabric is covered with stone or sand.

3.1.7 Filter fabric installed in association with shoulder drains or other subsurface drainage systems shall be installed in such a manner that all splice joints are provided with a minimum overlap of 2 feet. The overlap of the closure at the top of the trench shall be at least 6 inches and secured with mechanical ties. Where outlet pipe passes through the fabric, a separate piece of fabric shall be wrapped around the outlet pipe, flared against the side of the filled drain, and secured with anchor pins.

3.1.8 Field splices of filter fabric shall be anchored with anchor pins to insure that required overlap is maintained.

3.1.9 At the time of installation, the fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

3.1.10 Aggregate placement operations and the pipe installation shall be done so as to prevent damage to the filter fabric. Damaged sections of filter fabric shall be replaced at no cost to the OWNER.

3.1.11 The aggregate shall be compacted to a degree acceptable to the ENGINEER by the use of a vibratory compactor before making the filter fabric closure at the top of the trench.

3.1.12 Filter fabric installed in association with temporary silt fences shall be a water permeable filter type for the purpose of removing suspended particles from the water passing through it. Silt fences shall be constructed in accordance with local and state Department of Transportation requirements in the locations and to the configurations as shown in the plans and as directed by the ENGINEER. Should the requirements of local, regional or state authorities having jurisdiction over the project exceed the requirements of this section or other sections in this specification regarding temporary silt fences, the more stringent shall govern.

3.2 PHYSICAL PROPERTIES OF ENGINEERING FABRICS

PHYSICAL PROPERTIES OF ENGINEERING FABRICS					
Physical Property	Test Method (Article 1056- 2)	Type 1	Type 2	Type 3	
				Class A	Class B
Min. Roll Width	---	---	---	36"	36"
Min. Fabric Weight	1	4.0 oz/yd ²	---	---	---
Min. Tensile Strength	2	90 lb.	200 lb.	50 lb.	100 lb.
Elongation	2	80% Max.	15% Min.	30% Max.	25% Max.
Min. Burst Strength	3	150 psi	400 psi	100 psi	180 psi
Min. Puncture Strength	4	45 lb.	80 lb.	30 lb.	60 lb.
Apparent Opening Opening Size - Max/Min (U.S. Std. Sieve)	5	60/100	30/130	20/50	20/50
Min. Ultra-Violet Exposure Strength Retention	6	80 lb.	140 lb.	40 lb.	80 lb.
Fungus Resistance	7	No Growth	No Growth	No Growth	No Growth
Min. Permeability (Thickness x Permitivity)	8	0.2 cm/sec.	---	---	---
Min. Flow Rate	8	---	---	10 gal/min/ft ²	10 gal/min/ft ²
Typical Application	--	Shoulder Drain	Under Riprap	Temporary Silt Fence	

END OF SECTION

PART 1 DESCRIPTION

The work covered by this section consists of the furnishing, stockpiling if directed, placing and maintaining an approved stone liner placed in or at ditches, swales, pipe inlets, pipe outlets, and at other locations designated on the plans or directed by the ENGINEER. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.1.1. Reference the following specifications for related work:

01016	References to National and State Standard Specifications
02270	Erosion control

1.1.2. The stone for erosion control shall conform to all of Section 815 of the "Standard Specifications for Highway Construction" dated 2007 published by the South Carolina Department of Transportation and South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Bureau of Water South Carolina Department of Health and Environmental Control.

1.2. REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National or State Specifications and/or Regulations or meet the requirements of the latest revision of these specifications and regulations.

PART 2 MATERIALS

2.1 Stone for erosion control shall conform to SCDOT Section 800 requirements.

2.2 Stone for erosion control shall be resistant to the action of air and water, be of a hard, durable nature and shall range in size as follows:

<u>Class</u>	<u>Size</u>
A	2" - 6"
B	5" - 15"

2.3 All stone shall meet the approval of the ENGINEER. While no specific gradation is required, the various sizes of stone shall be equally distributed within the required size range.

The size of an individual stone particle will be determined by measuring along its long dimension.

PART 3 INSTALLATION

3.1 Unless otherwise directed by the ENGINEER, the stone shall be placed on slopes less than the angle of repose of the material and to the line, grade and slope as indicated on the plans. The stone shall be placed so that the smaller stones are uniformly distributed throughout the mass. All stone shall be placed in a neat, uniform layer with an even surface meeting the approval of the ENGINEER.

3.2 At locations where stone is required for channel changes and drainage ditches, the stone shall be placed prior to diverting the water into the channel changes and drainage ditches.

3.3 At locations where stone is required at the outlet of pipe culverts, the stone shall be placed immediately after completion of the pipe culvert installation.

END OF SECTION

PART ONE – GENERAL:

The work covered by this Section consists of the furnishing, installing, maintaining, replacing as needed, and removing of temporary silt fence. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications. All materials and procedures shall conform to the latest version of local and state Department of Transportation requirements.

1.1. Related Work

Any reference to standard specifications refers to the most current published date published of the following specifications unless otherwise noted.

1.1.1. Reference the following specifications for related work:

02270 Erosion Control

All applicable local design manuals, codes and/or ordinances for Erosion and Sedimentation Control. (Where these design manuals, local codes and ordinances are more stringent than the State Department of Transportation, these codes and/or ordinances will control the erosion and sedimentation control procedures to be followed.)

The temporary silt fence shall conform to the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

PART TWO – MATERIALS:**2.1. General Requirements**

Temporary silt fence shall be a water permeable filter type fence for the purposes of removing suspended particles from the water passing through it.

2.2. Posts

Steel posts must be used. Steel posts shall be at least 5 feet in length, approximately 1-3/8 inches wide measured parallel to the fence, and have a minimum weight of 1.25 lb/ft of length. The post shall be equipped with an anchor plate having a minimum area of 14.0 square inches, and shall have a means of retaining wire and fabric in the desired position without displacement.

2.3. Woven Wire Fence

Wire fence fabric shall be at least 32 inches high but no more than 36” high, and shall have at least 6 horizontal wires. Vertical wires shall be spaced 12 inches apart. The top and bottom wires shall be at least 10 gage. All other wires shall be at least 12-1/2 gage.

2.4. Silt Fence Filter Fabric

The filter fabric shall conform to the “Standard Specifications for Highway Construction”, latest edition, published by the South Carolina Department of Transportation and the South Carolina Stormwater Management and Sediment Control Handbook as published by EQC, Water Bureau, South Carolina Department of Health and Environmental control.

Silt fence which incorporates filter fabric meeting the requirements of these State Specifications, but which fail to perform in an acceptable manner shall be replaced with silt fences which are capable of acceptable performance. All silt fences shall meet the local governmental requirements as well as the State's requirements.

PART THREE – INSTALLATION:

3.1. General Requirements

3.1.1. The CONTRACTOR shall install temporary silt fence as shown on the plans or as required by field conditions. The silt fence shall be constructed at the locations shown on the plans and at all other locations necessary to prevent sediment transport, as directed by the ENGINEER.

3.1.2. Class A synthetic filter fabric may be used only in conjunction with woven wire fence fabric backing. Filter fabric shall be attached to the wire fence fabric by wire or other acceptable means.

3.1.3. Class B synthetic filter fabric may be used without the woven wire fence fabric backing, subject to the following conditions:

- Post spacing is reduced to a maximum of 6 feet.
- The proposed fabric has been approved by the ENGINEER as being suitable for use without the woven wire fence fabric backing.
- Fence posts shall be inclined toward the runoff source at an angle of not more than 20° from vertical.
- Posts shall be installed so that no more than 3 feet of the post shall protrude above the ground. Where possible, the filter fabric from a continuous roll cut to the length of the barrier shall be used to avoid joints. When joints are necessary, securely fasten the filter cloth only at a support post with overlap to the next post. At the time of installation, the fabric will be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

3.2. Maintenance and Removal

3.2.1. The CONTRACTOR shall inspect temporary silt fences at least once a week and after each rainfall and shall make any required repairs and remove and dispose of silt accumulation immediately. Should the fabric of the silt fence collapse, tear, decompose or become ineffective, the CONTRACTOR will replace it promptly at his own expense. The CONTRACTOR shall remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence.

3.2.2 The CONTRACTOR shall remove all temporary silt fence and associated appurtenances once all disturbed areas upland of the fence is properly and satisfactorily stabilized as called for on the plans.

(End of Section 02277)

SECTION 02500 CHAIN LINK FENCES AND GATES

PART ONE GENERAL

1.1 SCOPE

1.1.1 This section covers the furnishing and installation of chain link fence and gates as indicated on the Contract Drawings. Gates are to be the hinged swing type unless noted otherwise.

PART TWO PRODUCTS

2.1 MATERIALS

2.1.1 Wire: Fabric shall be of the "chain link" type, composed of individual wire pickets, helically wound and interwoven to form a square mesh. Wire used in the fabric shall be # 9 W & M gage unless noted otherwise. Wire fabric shall be basic open hearth steel, containing not less than 0.20% copper, and having a tensile strength after galvanizing of 90,000 psi. Fabric shall be woven so as to form mesh two inches square and shall measure a width equal to the fence height required on the Contract Drawings. The wire ends at the edges of the fabric shall be cut diagonally, and twisted to form "knuckles". The fabric shall be hot dipped galvanized after weaving, to produce a zinc coating weighing not less than 1.4 oz. per square foot of wire surface. Zinc coating shall withstand six one minute dips, when tested by methods outlined in ASTM Specification No. 391 Class I, or the latest revision.

2.1.2 Line Posts: Line posts shall be 2" O.D. galvanized steel pipe weighing 2.72 pounds per foot of length.

2.1.2.1 Post shall be high carbon rail steel for rolled sections or of new high carbon steel for tubular sections. All posts shall be hot galvanized to withstand twelve one-minute dips when tested by methods outlined in ASTM Specifications No. 391 Class I or the latest revision.

2.1.3 Top Rails: Top rails shall be of new 1-5/8" O.D. schedule 10 steel pipe in random lengths averaging not less than 20 feet and joined with pressed steel sleeves. Rail and sleeves shall be hot dipped galvanized to produce a zinc coating equal to that of the fabric.

2.1.4 Fabric Ties: Fabric ties for attaching fabric to line posts, top rail, or top wire, shall be galvanized wire of approved gauge and design. Ties shall be located on top rail every 12 inches and on line posts every 14 inches.

2.1.5 End and Corner Posts: Shall be hot galvanized basic open hearth or copper-bearing steel pipe, three-inch OD, weighing 5.79 pounds per foot.

2.1.5 Swing Gate Posts: Shall be same as end posts but in the following sizes:

Pipe Size OD	Weight per Foot	Gate Opening Single, Inclusive	Gate Opening Double, Inclusive
3"	5.79 lbs.	To 6'	Up to 12'
4"	9.11 lbs.	Over 6' to 13'	Over 12' to 26'
6-5/8"	19.97 lbs.	Over 13' to 18'	Over 26' to 36'
8-5/8"	25.00 lbs.	Over 18' to 32'	Over 36' to 64'

2.1.6 Brace and Tension Bands: Bands shall be unclimbable bevelled type with 3/8" diameter square shouldered, galvanized carriage bolts, non-removable from outside fence.

2.1.7 Bracing: All terminal posts shall be braced by means of 1-5/8" OD horizontal compression members, securely attached to terminal and first line posts with malleable iron fittings and beveled edge bands, and shall be truss braced from first line post to bottom of terminal posts with 3/8" rod and turn buckle. Corner posts shall be braced in each direction.

2.1.8 Tension Bars: Tension bars for attaching fabric to terminal posts shall be 3/16" x 3/4" high carbon steel attached to terminal post by means of beveled edge bands.

2.1.9 Swing Gate Frames: Swing gate frames shall be 2" OD Schedule 40 Pipe 2.72 #/Ft. with internal bracing of 1-5/8" OD Schedule 40 Pipe 2.27 #/Ft.

2.1.10 Gate Fillers: Gate frames shall be filled with same specifications of fabric as is used in line of fence.

2.1.11 Hinges: Hinges shall be double-clamping offset type, allowing gates to swing back parallel with line of fence and shall be made of malleable iron and forgings.

2.1.12 Latches: Latches shall be of eccentric double-locking type which engage strikes securely bolted to either gate frame or gate post at both top and bottom and in case of double gates engage also a heavy malleable iron non-freezing gate stop anchored in concrete footing. For walk gates up to and including 4' opening, a malleable iron gravity type latch shall be furnished which automatically engages pin welded in gate frame. All latches shall be made so as to be readily locked with padlock.

2.1.13 Gate Keeper: Each gate frame shall be equipped with a keeper which automatically engages the gate frame when swung to the open position.

2.1.14 Miscellaneous Fittings: All fittings entering into the fence, necessary to make a complete installation, shall be malleable iron, pressed steel, or forgings. All material shall be thoroughly galvanized by the hot dip method.

2.1.15 Quality: All fencing, posts, and gates shall be of a quality equal to standard fencing as furnished and erected by Hurricane Fence Company or Cyclone Fence Company.

2.1.16 Coating: All fencing, posts, rails, gates, and hardware shall be vinyl coated in accordance with ASTM F668. Vinyl coating (PVC) shall be thermally fused to the galvanized steel core wire. Color shall be black.

PART THREE EXECUTION

3.1 INSTALLATION

3.1.1 Fence and gates shall be installed at locations shown on the Contract Drawings. All posts up to and including 3" OD shall be set 36" in the ground. All other posts shall be set 42" in the ground. All posts shall be set in bell shaped concrete footings, crowned at top to shed water. Line posts shall be set not more than 10 feet on centers. Generally, fencing will follow the finished ground surface, but the Engineer may direct that minor irregularities in grade be adjusted during erection. Erection of all fencing shall be supervised by a competent erection man.

END OF SECTION

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PART 1 DESCRIPTION:

1.1 The work covered by this Section consists of the production, delivery, placement and compaction of various types of bituminous pavements for roadway and parking facilities. All bituminous pavement materials and installation shall conform to the "Standard Specifications for Highway Construction" latest edition, published by the South Carolina Department of Transportation (SCDOT).

1.2 The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.3 REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specifications or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications or meet the requirements of the latest revision of these specifications.

PART 2 MATERIALS:

2.1 **PRIME COAT:** Cut-back asphalt used as prime coat shall conform to the "Standard Specifications for Highway Construction" latest edition, published by the SCDOT.

2.2 **BITUMINOUS TACK COAT:** Bituminous tack coat shall conform to the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

2.3 **NON-STRIP ADDITIVE FOR PLANT MIX:** Non-strip additive for plant mix shall conform to the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

2.4 **BITUMINOUS CONCRETE BASE COURSE:** Bituminous concrete base course, shall conform to the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

2.5 **BITUMINOUS CONCRETE BINDER COURSE:** Bituminous concrete binder course shall conform to the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

2.6 **BITUMINOUS CONCRETE SURFACE COURSE:** Bituminous concrete surface course shall conform to the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

PART 3 INSTALLATION:

3.1 PRIME COAT: Prime Coat shall be applied to non-bituminous base course except beneath bituminous plant mixed pavements unless otherwise required by the plans. Prime shall be applied only when the surface to be treated is sufficiently dry and the atmospheric temperature in the shade away from artificial heat is 40°F or above for plant mix and 50°F or above for bituminous surface treatment. Prime coat shall not be applied when the weather is foggy or rainy. The base shall be cleaned of objectionable dust, dirt, clay and other deleterious matter prior to placing prime coat.

3.1.1 When directed by the ENGINEER, the CONTRACTOR shall dampen the surface of the base prior to application of the prime coat. Prime coat consisting of asphalt, Grade MC-30 or Grade RC-30 shall be applied at a rate of 0.18 to 0.45 gallons per square yards at an application temperature between 90°F and 130°F.

3.2 TACK COAT:

3.2.1 Tack coat shall be applied beneath each layer of bituminous plant mix base or pavement to be placed except where a prime coat or a newly placed bituminous surface treatment mat coat has been applied, unless otherwise directed by the ENGINEER. The tack coat material shall not be diluted or mixed with water, solvents, or other materials prior to application.

3.2.2 Tack coat shall be applied only when the surface to be treated is sufficiently dry and when the atmospheric temperature is 35°F or above in the shade away from artificial heat. Tack coat shall not be applied when the weather is foggy or rainy.

3.2.3 The existing bituminous or concrete surface to which tack coat is to be applied shall be cleaned of all dust and foreign material prior to placing the tack coat.

3.2.4 Tack coat shall be uniformly applied at a rate from 0.02 to 0.05 gallons per square yard. The exact rate of application will be established by the ENGINEER. The temperature of the tack coat material at the time of application shall be within the ranges shown below:

<u>Bituminous Material</u>	<u>Temperature Range</u>
Asphalt Cement, Grade AC-20	375° F - 500° F
Asphalt, Grade RS-1H	90° F - 150° F
Asphalt, Grade CRS - 1	90° F - 150° F
Asphalt, Grade CRS - 1H	90° F - 150° F
Asphalt, Grade HFMS - 1	90° F - 160° F
Asphalt, Grade CRS - 2	125° F - 185° F

3.2.5 No more tack coat material shall be applied than can be covered with base, binder, or surface course material during the next day's operation.

3.2.6 Tack coat material shall be applied with a distributor spray bar which can be adjusted to uniformly coat the entire surface at the directed rate. A hand hose shall be used for irregular

areas. Application of tack coat shall only be done in the presence of the ENGINEER or ENGINEER's representative. No base or surface mixture shall be deposited thereon until the tack coat has sufficiently cured.

3.2.7 Contact surfaces of headers, curbs, gutters, manholes, vertical faces of pavements, and all exposed traverse and longitudinal edges of each course shall be painted or sprayed with tack coat before mixture is placed adjacent to such surfaces.

3.2.8 After tack coat has been applied it shall be protected until it has cured for a sufficient length of time to prevent it from being picked up by traffic.

3.3 NON-STRIP ADDITIVE FOR PLANT MIX:

The non-strip additive shall be introduced and mixed into the asphalt cement in the presence of the ENGINEER unless it is added at the supplier's terminal and the rate, brand and grade are so noted on the asphalt cement ticket. The non-strip additive and asphalt cement shall be thoroughly mixed before being incorporated into the bituminous plant mix.

3.4 BITUMINOUS CONCRETE BASE COURSE:

3.4.1 The bituminous plant mix shall be compacted to a density of at least 90% of the maximum theoretical density.

3.4.2 No plant mix base course shall be placed that will not be covered with binder course or surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February.

3.4.3 Should the CONTRACTOR fail to cover the plant mix as required, it will result in the ENGINEER notifying the CONTRACTOR in writing to cover the plant mix with sand seal. The application of the sand seal shall be done by the CONTRACTOR at no cost to the OWNER.

3.5 BITUMINOUS CONCRETE BINDER COURSE:

3.5.1 The bituminous plant mix shall be compacted to a density of at least 94% of the laboratory density as determined by the Marshall method of test.

3.5.2 No plant mix base course shall be placed that will not be covered with binder course or surface course during the same calendar year or within 15 days of placement if the plant mix is placed in January or February.

3.5.3 Should the CONTRACTOR fail to cover the plant mix as required, it will result in the ENGINEER notifying the CONTRACTOR in writing to cover the plant mix with sand seal. The application of the sand seal shall be done by the CONTRACTOR at no cost to the OWNER.

3.6 BITUMINOUS CONCRETE SURFACE COURSE

The bituminous plant mix shall be compacted to a density of at least 95% of the laboratory density as determined by the Marshall method of test.

3.7 OPEN GRADED ASPHALT FRICTION COURSE

3.7.1 The existing surface shall be cleaned in an acceptable manner prior to placement of any bituminous material.

3.7.2 Any part of finished friction course which shows non-uniform distribution of asphalt cement shall be removed and replaced at no cost to the OWNER.

3.8 ASPHALT DRAINAGE COURSE

A prime coat or tack coat will not be required. The mix shall be compacted to a degree acceptable to the ENGINEER.

PART 4 TESTING:

All testing requested by the ENGINEER shall be done by the CONTRACTOR in accordance with the "Standard Specifications for Highway Construction" published by the SCDOT, latest edition.

(End of Section 02511)

PART ONE - GENERAL:

1.01 - SCOPE

This section covers Portland cement curbs complete, including such excavation, fine grading, backfilling and shaping adjacent surfaces as required.

1.02 - STANDARDS AND SPECIFICATIONS

Except as indicated or specified otherwise, materials and methods shall conform to the South Carolina State Highway Department Standard Specifications for Highway Construction, latest Edition and latest Sections.

PART TWO - PRODUCTS:

2.01 - CONCRETE

Concrete shall be not less than 3,500 psi at twenty-eight (28) days in accordance with the applicable requirements of the referenced specifications.

PART THREE - EXECUTION:

3.01 – CURBS

Construct in accordance with location, line, grade and details shown on the drawings and in accordance with the applicable requirements of the South Carolina State Highway Department Standard Specifications for Highway Construction, latest Edition. See details.

(End of Section 02515)

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PART ONE - GENERAL

1.1 Summary

1.1.1 Concrete sidewalk shall be constructed of Portland cement concrete, at the locations and to the dimensions, lines, grades and cross section indicated on the Drawings or as directed by the ENGINEER and in conformity with the provisions and requirements set out in these Specifications.

1.1.2 Concrete driveways shall be constructed of Portland Cement concrete, at the locations and to the dimensions, lines, grades and cross section indicated on the Drawings or as directed by the ENGINEER, and in conformity with the provisions and requirements set out in these Specifications.

1.1.3 Concrete sidewalk and driveway shall include all the necessary excavation, unless otherwise indicated, subgrade and subbase preparation, backfilling, final CLEANING up and completing all incidentals thereto, as indicated on the Drawings or as directed by the ENGINEER.

1.2 Related Work Specified Elsewhere:

Excavation and Backfill	Section 02220
Cast-In-Place Concrete	Section 03300
Concrete Sidewalks and Brick Foundation	Section 03310

PART TWO - PRODUCTS

2.1 Materials

2.1.1 Materials used in the construction of sidewalks and driveways, in addition to the general requirements of these Specifications, shall conform, unless otherwise stipulated, to the following:

2.1.1.1 Concrete shall be manufactured of the materials meeting the requirements of and in accordance with the provisions and requirements for Class "A" concrete as set out in Section 03300 of these Specifications.

2.1.1.2 Crushed stone for base shall meet the gradation requirements for Size 7 or 8 as specified in ASTM D 448 or AASHTO M43.

2.2 Form Material

2.2.1 Forms may be constructed of wood or metal.

2.2.2 The lumber to be used in the construction of wood forms shall be free of bulge or warp, of uniform width, not less than 2-inches (commercial) in thickness, except that 1-inch thickness may be used on curves and shall be sound and free from loose knots. Stakes shall be not less than 2 x 4-inch lumber of sufficient length that, when driven they will hold the forms rigidly in place.

2.2.3 Metal forms shall be approved sections and shall have a flat surface on top. They shall present a smooth surface of the desired contour, sufficiently thick and braced to withstand the weight of the concrete without bulging or becoming displaced.

PART THREE - EXECUTION

3.1 Labor

3.1.1 For finishing, competent and skilled finishers shall be provided.

3.2 Equipment

3.2.1 All equipment necessary and required for the construction of concrete sidewalks, curb and gutter, must be on the Project, proven to be in first class working condition and approved by the ENGINEER, before construction will be permitted to begin.

3.2.2 A one bag mixer will be permitted when the total output of concrete, per 10-hour day does not exceed 25 cubic yards.

3.2.3 Satisfactory floats, edgers, spades and tamps shall be furnished. Tamps of not over 8-inch diameter and weighing not less than 25 pounds shall be provided for tamping subgrade. A 10-foot longitudinal float of the inverted T-type with plough handles attached for manipulation, and a rigid float not less than 18-inches longer than the width of the walk being constructed, shall be provided.

3.3 Removal of Structures and Obstructions

3.3.1 Remove existing curbs, gutters, sidewalks, driveways and other structures shown on the drawings to be removed.

3.3.2 Cut existing concrete neatly, load and haul debris to an SCDHEC approved disposal areas.

3.4 Road and Drainage Excavation

3.4.1 Road and drainage excavation, as indicated on the Drawings or as directed by ENGINEER, shall be performed in accordance with the requirements of Section 02200 of these Specifications.

3.5 Embankment Construction

3.5.1 Embankment construction, as indicated on the Drawings or as directed by the ENGINEER, shall be performed in accordance with the provisions of Section 02200 of these Specifications.

3.6 Subgrade Preparation

3.6.1 The subgrade for sidewalks and driveways shall be formed by excavation to a depth equal to the thickness of the concrete plus 2-inches.

3.6.2 All subgrade shall be of such width as to permit the proper installation and bracing of the forms.

3.6.3 Yielding, or unsuitable material shall be removed and backfilled with satisfactory material. Place 6-inches of graded aggregate base under commercial/industrial driveways, compacted thoroughly and finished to a smooth, unyielding surface and proper line, grade and cross section of the proposed construction.

3.7 Forms

3.7.1 All forms shall be set upon the prepared subgrade, true to lines and grade, and held rigidly in place so as to not to be disturbed or displaced during the placing of the concrete. The top of the form shall be set to exact grade and the height shall be equal to not less than the thickness of the proposed concrete.

3.7.2 All forms shall be so constructed as to form the cross section, contour, etc., of the proposed construction.

3.7.3 Immediately before placing the concrete, the forms shall be given a coat of light oil and where being removed and used again, the forms shall be thoroughly cleaned and oiled each time.

3.7.4 Forms shall be removed within 24 hours after placing concrete and no pressure shall be exerted upon the concrete in removing forms.

3.7.5 When the sidewalk is to be joined to an existing sidewalk, the existing sidewalk, if not in proper condition for the junction, shall be cut to a neat line perpendicular to both the centerline and the surface, or as indicated by the ENGINEER.

3.8 Expansion Joints

3.8.1 Unless otherwise indicated on the Drawings or as directed by the ENGINEER, premoulded expansion joint filler, ½" in thickness, shall be placed at the locations and in line with expansion joints in the adjoining pavement, gutter, and not otherwise indicated on the Drawings, a ½" premoulded expansion joint filler shall be placed at intervals of not over 50 feet apart. All premoulded expansion joint filler must be cut to full width or length of the proposed construction and shall extend to within 1-inch of the top or finished surface. All longitudinal expansion joints shall be placed as indicated on the Drawings or as directed by the ENGINEER.

3.8.2 All expansion joints shall be true, even and present a satisfactory appearance.

3.8.3 All expansion joint material protruding after the concrete has been finished shall be trimmed as directed by the ENGINEER.

3.9 Manufacturing and Placing Concrete

3.9.1 Immediately before placing concrete, the depth of the proposed concrete shall be checked by means of a template cut true to the cross section of the proposed construction and any irregularities shall be corrected.

3.9.2 Immediately before placing concrete, all subgrade shall be thoroughly sprinkled or wetted.

3.9.3 Concrete shall not be placed upon a frozen subgrade or subbase.

3.9.4 Construction joints will be permitted only at grooves or at expansion joints, unless otherwise approved by the ENGINEER.

3.9.5 The concrete shall be manufactured and placed in accordance with the requirements of Section 03300 of these Specifications.

3.9.6 The concrete shall be placed immediately after mixing, the edges, sides, etc., shall be thoroughly spaded and the surfaces tamped sufficiently to thoroughly compact the concrete and bring the mortar to the surface. The concrete shall be deposited and compacted in a single layer.

3.10 Finishing

3.10.1 The concrete shall be stuck-off with a transverse template resting upon the side forms and then shall be floated with a 10 foot longitudinal float working the float transversely across the concrete with a sawing motion, always maintaining it parallel to the edges of the sidewalk, or driveway, where practicable, and in such a manner that all surplus water, laitance and inert material shall be removed from the surface. This operation shall be continued until the surface of the concrete shows no variation from 10-foot straightedge. If necessary, additional concrete shall be added to fill depressions, and the longitudinal float used again. The longitudinal float shall not be moved ahead more than one-half its length at any time.

3.10.2 When the surface of the concrete is free from water and just before the concrete obtains its initial set, it shall be gone over and finished with a wooden float so as to produce a sandy texture. The longitudinal surface variations shall be not more than 1/4-inch under a 12-foot straightedge, nor more than 1/8-inch on a five foot transverse section. The surface of the concrete must be finished so as to drain completely at all times.

3.10.3 The edges of the sidewalks or driveways shall be carefully finished and rounded with an edging tool having a radius of 1/2".

3.10.4 The surface of sidewalks shall be divided into blocks by use of a grooving tool. Grooves shall be placed so as to cause contraction joints to be placed at a groove line, where practical. The grooves shall be spaced approximately five feet apart and the blocks shall be rectangular unless otherwise ordered by the ENGINEER. The grooves shall be cut to a depth of not less than 1-inch. The edges of the grooves shall be edged with an edging tool having a radius of 1/4-inch, and any marks caused by edging or otherwise shall be removed with a wetted brush or wooden float so as to give the surface a uniform texture and finish.

3.10.5 The edges of the concrete at contraction joints shall be rounded with an edging tool having a radius of 1/4-inch. The top and ends, where practicable, of expansion joint material shall be cleaned of all concrete and the expansion joint material shall be trimmed so as to be slightly below the surface of the concrete. All marks caused by edging shall be removed with a wetted brush or wooden float.

3.11 Protection and Curing

3.11.1 Immediately after finishing the concrete, it shall be covered and cured in accordance with the requirements of Section 03300 of these Specifications. If the temperature falls to below freezing, satisfactory heating devices shall be placed under suitable covers to keep the temperature around the concrete at above 45 degrees F.

3.11.2 Pedestrians will not be allowed upon concrete sidewalks or driveways until 12 hours after finishing concrete, and no vehicles or loads shall be permitted upon any sidewalk or driveway until the concrete has attained sufficient strength for such traffic.

3.11.3 The CONTRACTOR shall construct such barricades and protection devices as are necessary to keep pedestrians and traffic off the sidewalks or driveways.

3.11.4 If any sidewalk or driveway is damaged at any time previous to final acceptance of the project, it shall be repaired by removing all concrete within the limits of the grooves, and be replaced, at the CONTRACTOR's expense, with concrete of the type, kind and finish in the original construction.

3.12 Backfilling

3.12.1 Immediately after the concrete has set sufficiently, the spaces along the sides or edges of the sidewalk or driveway shall be refilled with suitable material, this material shall be in compacted layer of not over 4-inches each, until firm and solid.

3.13 Cleaning

3.13.1 All excess or unsuitable material shall be removed and disposed of in accordance with requirements of Section 02200 and 02220 of these Specifications.

3.13.2 Final clean-up shall be performed in accordance with the requirement of Section 02995 of these Specifications.

3.13.3 All material becoming the property of the OWNER shall be stored in a manner and at locations near or on the Project as directed by the ENGINEER.

(End of Section 02523)

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SECTION 02527 CONCRETE CURB, CURB AND GUTTER, AND GUTTER

PART 1 DESCRIPTION

The work covered by this Section consists of the construction of Portland cement concrete curb, curb and gutter, concrete noses and concrete gutter necessary to complete the project. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the project in conformance with the plans and specifications.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2. Reference the following specifications sections for related work:

02231 Subgrade

References to National Specifications for related work:

ASTM C150 - Type T Portland Cement

ASTM Material Specifications as listed Concrete Products (Section 02513 Part 2)

ASTM Testing Requirements - As listed under testing in Section 02513.3.4.2

AASHTO Material Requirements - As listed under Concrete Products (Section 02513 Part 2)

AASHTO Testing Requirements - As listed under Concrete Products (Section 02513 Part 2)

1.3. REFERENCES

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications or meet the requirements of the latest revision of these specifications.

1.3.1 All concrete curb, curb and gutter, and gutter installation shall conform to the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

1.4. The CONTRACTOR shall furnish all equipment, tools, labor, and materials necessary to complete the work in accordance with the plans and specifications.

PART 2 MATERIALS

All materials shall meet the requirements of Section 03300, Cast In Place Concrete, of these specifications.

PART 3 INSTALLATION

3.1. GENERAL

All concrete curb, curb and gutter, and gutter installation shall conform to the “Standard Specifications for Roads and Structures” latest edition, published by the South Carolina Department of Transportation.

3.2 CONCRETE

Class B concrete shall be used. Prior to placing forms the base or subgrade shall have been compacted to the degree required by the applicable section of these specifications.

3.3 FORMS

Forms shall be of such section and design that they will adequately support the concrete and any construction equipment used to construct the work. Straight forms shall be within a tolerance of 1/8 inch in 10 feet from a true line horizontally and vertically. Form pins shall be metal and shall be capable of holding the forms rigidly in place during construction operations. The form sections shall be connected by a locking joint that shall keep the forms free from vertical and horizontal movement.

3.4 FINISHING

The concrete shall be given a light broom finish with the brush marks parallel to the curb line or gutter line.

3.5 JOINTS

3.5.1 Joints shall be located as shown on the plans except as otherwise provided herein. Joint spacing shall not be less than 10 feet. Where concrete is placed adjacent to Portland cement concrete pavement, the joints shall be located so as to line up with the joints in the concrete pavement.

3.5.2 Grooved contraction joints shall be formed by the use of templates or by other approved methods. Where such joints are not formed by templates, the move shall be of the depth shown on the plans.

3.5.3 Grooved butt joints shall be placed between the work and adjacent pavement except where expansion joints are required by the plans.

3.5.4 All joints shall be sealed except for joints in curb sections not having an integral gutter. In curb and gutter the joint sealer shall not be poured above the top surface of the gutter. Joints in gutter shall be filled with joint sealer to the top surface of the gutter. Joints shall be sealed before backfilling or other adjacent operations are performed.

(End of Section 02527)

PART ONE – DESCRIPTION:

This section covers cutting and replacing pavement for the installation of utilities as shown on the plans and as specified herein. Any reference to sections of state specifications shall be in conformance with the state specifications referred to in the Section 1.2.1 Related Work.

1.1.

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.1.1 Related Work

See the following sections for related specifications:

02222	Excavating, Backfilling & Compacting for Utilities
03300	Cast-in-Place Concrete:

1.3 References

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

1.3.1 See the following References to Nation Specifications for related work:

MP 1	AASHTO
M81	AASHTO
M82	AASHTO
T96	AASHTO
T176	AASHTO

PART TWO – MATERIALS:

2.1 Aggregate Base Course shall be in accordance with the SCDOT Section 305. Aggregate base course material shall consist of crushed stone, crushed stone, crushed or uncrushed gravel and other similar materials displaying hard, strong durable particles free from adherent coatings. All aggregate shall be from and approved sources in accordance with SCDOT Section 305.

2.2 Bituminous Paving

2.2.1 Bituminous Prime Coat: Cut-back asphalt used as prime coat shall conform to SCDOT Section 401.

2.2.2 Bituminous Base Course: Shall conform to SCDOT Section 401 and 402.

2.2.3 Bituminous Tack Coat: Shall conform to SCDOT Section 401.

2.2.4 Bituminous Surface Coat: Shall conform to SCDOT Section 403.

2.3. Portland Cement Course

Shall be composed of Portland cement, coarse aggregate, fine aggregate and air entraining agent in accordance with Section 03300. Other admixtures may be added with the ENGINEER's approval. All concrete shall be Class A concrete with a minimum of 3500 psi compressive strength at 28 days. The concrete shall be air entrained to provide an air content of 4.5 percent plus or minus 1.5 percent.

PART THREE – CONSTRUCTION:

3.1 Pavement Cutting: Where the existing pavement is to be cut for installation of pipe or other utilities, the CONTRACTOR shall cut the pavement neatly in advance of trenching. All pavement shall be cut to a straight edge with the method of cutting subject to approval of the ENGINEER. Pavement shall be cut 12 inches wider on each side of the excavated area. Ragged or irregular edges will be redone. Concrete pavement shall be cut with a suitable concrete saw cutting equipment.

3.2 Trench Backfilling: Shall be in accordance to plans or as specified elsewhere herein.

3.3 Aggregate Base Course shall be placed and compacted in accordance with SCDOT Section 305.9 and 305.11. The base course shall be placed at the same time with the trench backfilling.

3.3.1 If the base course is designed to be used as a temporary travel surface, the additional thickness shall be placed, compacted and maintained until the permanent surface is placed. When preparing the base course for the final surface course, the base course material shall be undercut to the thickness to accommodate the surface course(s) and removed from the site, unless otherwise directed by the ENGINEER. The final thickness of the base shall be within a tolerance of plus or minus 1/2 inch of the base thickness required on the plans.

3.3.2 Backfilling with soil above an elevation to accommodate the final base thickness, to be cut-out and replaced with base material at a later date, will not be allowed.

3.4 Prime Coat

Shall be applied to non-bituminous base course beneath bituminous plant mixed pavements unless otherwise shown in the plans. The prime coat shall be applied only when the surface to be treated is dry and the atmosphere temperature in the shade is 40° F or above. Prime coat shall not be applied when the weather is foggy or rainy. The base shall be clear of debris, dirt, clay or other deleterious material prior to placing the prime coat.

3.4.1 Application of the prime coat shall consist of asphalt grade AASHTO 81 for Grade RC-70 except kinematic viscosity at 140° F, centistokes shall be a minimum of 30 and a maximum of 60; the distillate, percentage of volume of total distillate to 680°F, shall be as follows:

To 374°F	15 minimum
To 437°F	55 minimum
To 500°F	75 minimum

To 600°F

90 minimum

and the residue from the distillate to 680°F volume percentage of sample difference shall be a minimum of 50 or of shall be of asphalt grade AASHTO 82. The prime coat shall be applied at a rate of 0.18 to 0.45 gallons per square yard at an application temperature of 90° to 130°F.

3.5 Bituminous Concrete Surface Course, Type I-2

The surface course shall conform to SCDOT using Section 403 Type 1C Asphalt. **Pavement shall be replaced within the same week that it is cut.** If inclement weather delays pavement replacement, the CONTRACTOR shall not cut additional pavement until he has notified the ENGINEER and received specific permission and instructions. Any deviation from this schedule could subject the CONTRACTOR to immediate shut-down or non-payment of additional work performed until pavement repair is complete.

3.5.1 The bituminous plant mix placement and compaction shall conform to SCDOT" Section 401. If directed by the ENGINEER, density control and determination shall be in Accordance to SCDOT" Section 401.

3.6 Portland Cement Concrete shall be placed over a compacted sub-base of CABC stone with the surface damp at time of placement. The concrete patch shall equal the thickness of the surrounding pavement, but shall not be less than 4 inches thick. The concrete shall be handled to prevent segregation and kept free from mud, soil or other foreign matter.

3.6.1 Concrete placement shall not be undertaken or shall be discontinued when any of the following conditions exist:

3.6.1.1. When the descending air temperature in the shade and away from artificial heat reaches 40°F.

3.6.1.2. When the subgrade or base course is frozen.

3.6.1.3. When the temperature of the concrete mix exceeds 90°F.

3.6.1.4. When the time after batching exceeds 90 minutes.

3.6.2 Concrete finishing shall consist of screeding and floating to assist consolidation. The surface texture shall closely resemble the texture of the surrounding pavement. A uniform surface texture shall be applied by burlap dragging or other method acceptable to the ENGINEER. The use of excessive water during finishing will not be permitted.

3.6.3 Concrete curing shall be accomplished with spray compounds, polyethylene film or other methods acceptable to the ENGINEER. In no instance shall the method of curing be allowed to damage the finished surface. Any concrete with excessive surface damage will be considered defective work and removed and replaced at the CONTRACTOR's expense.

3.6.4 Concrete shall be protected from cold for a minimum of 72 hours through thermal blankets or other means acceptable to the ENGINEER. Thermal protection will be required whenever the air temperature is expected to fall below 40°F. Concrete damaged as the result of freezing shall be removed and replaced at the CONTRACTOR's expense.

(End of Section 02575)

PART ONE - GENERAL

1.1 Related Documents

1.1.1 Requirements of the General Provisions apply to all Work in this Section. Provide all labor, materials, equipment and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.2 Description of Work

1.2.1 The Work includes furnishing all labor, equipment, and materials and performing all the operations required for the installation of all brick pavers in roadways, sidewalks, driveways, borders, and row-lock paving on a prepared subgrade and concrete base as indicated on the Drawings. Work also includes providing the brick columns as indicated. All brick work shall be constructed to the lines, grades and cross-sections indicated on the Drawings.

1.3 Related Work Specified Elsewhere

Excavation and Backfill	Section 02220
Cast-In-Place Concrete	Section 03300

1.4 Quality Assurance

1.4.1 Installer: The CONTRACTOR or Subcontractor performing the masonry paving work must have at least 5 years of successful experience in the required types of paving application.

1.4.2 Product Handling: Protect brick paving and column materials during storage and construction against wetting by rain, snow or ground water and against soilage or intermixture with earth or other types of materials.

1.4.2.1 Protect grout and mortar materials from deterioration by moisture and temperature. Store in a dry location or in waterproof container.

1.4.3 Hot Weather Requirements: Protect brick work in hot weather to prevent excessive evaporation of setting beds and grout. Provide artificial shade, wind breaks and use cooled materials, as required.

1.5 Submittals

1.5.1 Brick: For a brick to be considered as an approved equivalent to the shade specified, the CONTRACTOR shall submit a sample panel showing consistent brick color to the following address no later than 5:00 PM, two weeks prior to bid opening.

The LandPlan Group South, Inc.
1206 Scott Street
Columbia, SC 29201
ATTN: Charles Howell

1.5.2. Sample Panels: The CONTRACTOR shall construct a sample with full range of brick and mortar colors for the pavement prior to the start of any paving. The work will be inspected by the OWNER and ENGINEER. If the original sample panel is not acceptable, the CONTRACTOR shall provide additional samples at no cost to the OWNER. Accepted sample shall become the standards for the entire job, and shall remain undisturbed until completion of all paving and walk work. All work must have full range of previous colors approved in sample.

1.5.3 The following sample panel shall be constructed separate and distinct from the final paving. Panel size indicated will be the minimum size accepted

1.5.3.1 A 4' x 4' panel of brick paving with the single brick curb border and brick column in accordance with the drawing details for the work.

PART TWO - PRODUCTS

2.1 Brick Columns and Signage: Supply a brick that matches existing columns that is 3-5/8" x 7-5/8" x 2-1/4" in size. The paver shall be SELECTED BY OWNER (contractor to submit samples) or approved equal. The brick/paver must conform to meet ASTM C902, Class SX, Type 1 for traffic.

2.2 All brick shall be supplied by the same manufacturer. The brick shall conform to ASTM 216 and/or ASTM C902, as applicable.

2.3 Mortar: Mortar shall conform to the South Carolina Highway Department Standard Specifications and shall be buff in color.

2.4 Joint Filler: Preformed expansion joint fillers shall be non-extruding resilient, non-bituminous type, conforming to AASHTO M153, Type II, and South Carolina State Highway Department Standards.

2.4.1 Unless otherwise indicated on the Drawings, joint filler shall be 1/2inch.

2.5 Sand: Sand shall be a clean aggregate with less than 10% fines.

PART THREE - EXECUTION

3.1 Brick Border

3.1.1 The CONTRACTOR shall install the concrete foundation for the brick border in accordance with the details and Section 03300. The CONTRACTOR shall then spread a damp/sand cement bed on the foundation. The brick is to have the 4"x8" surface exposed. The mortar joint for the brick border course shall be nominal 3/8-inch, with no joint smaller than 1/4" and no joints greater than 5/8". For brick border in a curved pattern that does not conform to this joint maximum and minimum shall be sawn as required.

3.2 Brick Column Cap

3.2.1 The brick column cap is to have the 4"x8" solid surface exposed. The mortar joint for the row-lock shall be nominal 3/8-inch, with no joint smaller than 1/4" and no joints greater than 5/8".

3.3 Repair, Pointing and Cleaning

3.3.1 Removal of Units: Remove masonry units which are loose, chipped, broken, stained, or otherwise damaged, or if units do not match adjoining units and install in fresh mortar, pointed to eliminate evidence of replacement.

3.3.2 Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings, and adjacent work to provide a neat, uniform appearance, properly prepared for application of sealant compounds.

3.3.2.1 At completion of masonry work, point holes in exposed masonry, and cut out defective joints and tuck point solidly with mortar which has been retempered one or two hours after original mixing.

3.3.3 Cleaning: During construction, keep the exposed faces clean of mortar and other stains. When mortar joints reach thumbprint hardness and are tooled, brush the exposed work with a soft fiber brush to remove adhering mortar, and use a wood paddle to remove more tenacious material. Protect bases of walls from splash stains by covering the adjacent ground with sand, sawdust, or polyethylene.

3.3.3.1 Clean exposed brick masonry surfaces as recommended by BIA Technical Note 20 "Cleaning Clay Products Masonry".

3.3.4 Protection: Advise the ENGINEER of proper procedures required to protect the masonry work from deterioration, discoloration or damage during subsequent construction operations.

3.3.5 Sand-and-Swept Joints: After placement of brick paving, coarse, clean sand shall be swept into the joints for the full depth of the bricks. The CONTRACTOR shall be responsible for reapplication as necessary to achieve the full depth of sand.

(End of Section 02614)

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PART ONE - GENERAL

1.1 Related Documents

1.1.1 Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein or reasonably necessary for and incidental to a complete job.

1.2 Description of Work

1.2.1 This work includes the removal of pavement and later reconstruction of base and surface courses affected or damaged by the CONTRACTOR's operations whether inside or outside the normal trench limits as indicated on the Drawings and herein specified.

1.3 Quality Assurance

1.3.1 Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

SCDOT South Carolina State Highway Department Standard
 Specification for Highway Construction, Latest Edition

1.3.2 Qualifications of Workmen: For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.

1.4 Product Delivery

1.4.1 General: Transport asphalt cement mixtures from the mixing plant to the project site in trucks having tight, clean compartments. Provide covers over asphalt cement mixture when delivering to protect the mixture from weather and to prevent loss of heat. During period of cool weather or for long-distance deliveries, provide insulation around entire truck bed surfaces.

PART TWO - PRODUCTS

2.1 Surface Course

2.1.1 Asphaltic Concrete: Comply with the requirements of SCDOT Specifications, Section 403, HOT LAID ASPHALTIC CONCRETE SURFACE COURSE.

2.1.2 Composition of Mixture: Comply with the requirements of SCDOT Specifications subsection 403.03, Composition of Mixture, Type 2. Furnish samples if requested by the ENGINEER.

2.2 Base Course

2.2.1 Stabilized Aggregate Base Course: Comply with the requirements of SCDOT Specifications, Section 306, STABILIZED AGGREGATE BASE COURSE, Type I or II gradation, without priming.

PART THREE - EXECUTION

3.1 Inspection

3.1.1 Examine the areas and conditions under which pavement will be removed and replaced and notify the ENGINEER in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 Base Course

3.2.1 Preparation of Surfacing: After the back filled trenches have had adequate time to consolidate or have been thoroughly compacted by tamping or rolling, remove the material used for backfilling to a depth required for the base and surface courses. Remove all loose and damaged material in existing paving and trim back the existing surface to ensure a satisfactory bond between it and the new paving.

3.2.2 Gravel Base Course: Construct the stabilize aggregate base course to comply with the applicable sections of SCDOT Specifications, Section 306, STABILIZED AGGREGATE BASE COURSE. Unless otherwise directed by the ENGINEER, construct the base course to the following thickness:

Transverse Cuts: 12 inches

Longitudinal Cuts: 6 inches

3.3 Hot Laid Asphaltic Concrete Surface Course

3.3.1 General: Do not feather the edges between the new and existing pavement. Ragged edges will not be allowed between the new and existing pavements. The existing pavement must be cut back for sufficient width to provide straight edges as shown on the Drawings. Unless otherwise shown on the Drawings, the surface course thickness is 2 inches.

3.3.2 Installation Requirements: Comply with the requirements of SCDOT Specifications, subsection 403.05, Equipment Requirements, and subsection 403.06, Construction Requirements.

3.3.3 Tying to Existing Bituminous Pavement: Where new pavement ties to existing pavement, cut the existing pavement to a straight line and completely remove all materials on the new pavement side of the cut and replace with new materials. Coat the cut line with a tack coat to furnish

a bond between the existing surface course and the new surface course. Do not allow the new work to overlap the existing work.

3.3.4 Maintaining Permanently Placed Surfaces Under This Contract: Until the expiration of the guarantee period, maintain surfaces placed under this Contract. Should an area settle that the CONTRACTOR has paved, he will remove the entire pavement in the area; feathering of edges will not be permitted. Add necessary sub-base material as specified herein before to the depth of the applicable surface course. Replace the surface course as herein before specified, all without additional cost to the OWNER.

3.3.5 Clean-Up: Upon completion of paving, remove all surplus materials, dunnage, cartons, and other debris resultant from work of this Section. Leave entire work in satisfactory, acceptable, broom-clean condition.

(End of Section 02616)

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PART 1 DESCRIPTION:

The work covered by this section consists of the construction of cast-in-place or precast concrete, brick masonry or block masonry, catch basins, inlets, junction boxes, spring boxes, manholes or other minor drainage structures, excluding endwalls together with all necessary metal grates, covers, frames, steps and other hardware. The CONTRACTOR shall furnish all equipment, tools, labor, and materials necessary to complete the work in accordance with the plans and specifications.

1.1. RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specifications unless otherwise noted.

1.1.1. Reference the following specifications for related work:

- AASHTO – T99 Foundation Compaction
- ASTM A48 Grey iron Casting

All drainage structures and inlets shall conform to the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

PART 2 MATERIALS

2.1. The CONTRACTOR may, at his option, use either cast-in-place concrete, brick masonry, block masonry, or precast concrete construction, provided that the type of construction he wishes to use is permitted by the plans, and is constructed in conformance with the local and state Department of Transportation requirements.

2.2. Shop drawings consisting of catalog cuts or fabricator drawings showing the structure, reinforcing alignment of all wall penetrations and frames, grates, or covers shall be submitted by the CONTRACTOR to the ENGINEER for approval.

2.3. IRON CASTINGS

2.3.1. Iron castings shall be boldly filleted at angles, and the arises shall be sharp and perfect. No sharp, unfilleted angles or corners will be permitted. They shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes, and other defects affecting their strength and value for the service intended. All castings shall be sand blasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean, and uniform surface.

2.3.2. Gray iron castings shall meet the requirements of ASTM A48 for Class 30 iron.

2.3.3. Steps for minor drainage structures shall be fabricated from deformed reinforcing bars, or shall be gray iron castings or shall be of composite plastic-steel construction as shown on the plans, or as referenced above.

2.4. PRECAST DRAINAGE STRUCTURES

2.4.1. Precast drainage structures shall have no more than 4 holes cast or drilled in each unit for the purpose of handling or placing unless otherwise approved by the ENGINEER. All lift holes and handling devices shall be located in accordance with plan and design requirements. Units damaged while being handled or transported will be rejected or shall be repaired in a manner approved by the ENGINEER.

2.4.2. Precast units shall not be transported away from the casting yard until the concrete has reached the minimum required 28-day compressive strength and a period of at least 5 days has elapsed since casting, unless otherwise permitted by the ENGINEER.

2.4.3. Steps for precast drainage structures shall meet the requirements of AASHTO M199 for design, materials, and dimensions. Steps shall be incorporated in all drainage structures over 3'-6" in height. The lowest step shall be no more than 16" from the bottom.

2.4.4. The following information shall be clearly shown on each precast member.

- Date of manufacture
- Name of manufacturer

PART 3 INSTALLATION

3.1. The CONTRACTOR shall take the necessary precautions to insure that all excavations for drainage structures are maintained in a dry condition to allow proper compaction beneath the structure and backfill once the structure has been completed.

3.2. Where the foundation material is found to be of poor supporting value or of rock, the ENGINEER may make minor adjustment in the location of the structure to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned by removing the existing foundation material by undercutting to the depth as directed by the ENGINEER and backfilling with either a suitable local material secured from unclassified excavation or borrow excavation at the nearest accessible location along the project, or foundation conditioning material consisting of crushed stone or gravel or a combination of sand and crushed stone or gravel approved by the ENGINEER as being suitable for the purpose intended. The selection of the type of backfill material to be used for foundation conditioning will be made by the ENGINEER.

3.3. The CONTRACTOR shall install poured concrete foundations or precast concrete bases for all drainage structures.

3.4. Where **PRECAST FOUNDATION** slabs are used, the slab shall be set to within plus or minus ½inch of grade on a bed of size 57 crushed stone measuring 6 inches in thickness minimum after being compacted to 98% maximum density in accordance with AASHTO T99.

3.5. PRECAST STRUCTURES

Joints on precast concrete sections shall be completely filled with bituminous mastic jointing compound or joints shall be made with cement mortar with inside pointing and outside rubber wrap.

3.6. MASONRY STRUCTURES

3.6.1. No masonry drainage structure shall be placed until the foundation has been approved by the ENGINEER.

3.6.2. Brick shall be wet when laid. Lay brick or concrete masonry units in mortar so as to form full bed, with end and side joints in one operation, with joints not more than 3/8" wide except when bricks or concrete masonry units are laid radially, in which case narrowest part of joint shall not exceed 1/4". Lay in true line and whenever practical joints shall be carefully struck and pointed on inside.

3.6.3. Protect fresh masonry work from freezing, from drying effects of sun and wind, and for such time as directed by ENGINEER. In freezing weather, heat materials sufficiently to remove ice and frost.

3.6.4. The outside surfaces of brick or concrete masonry portion of drainage structures shall be plastered and troweled smooth with 1/2" layers of cement mortar.

3.7. BACKFILLING around all drainage structures and inlets shall be done in such a manner so as not to damage either the structure or pipes connecting to the structure. Compaction of backfilled material shall be accomplished in 6-inch lifts (loose) per section 31 2000.1 Earthwork.

(End of Section 02721)

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PART ONE – DESCRIPTION:

The work covered by this section consists of all excavation, bedding, laying pipe, jointing and coupling pipe sections, and backfilling necessary to install the various types of pipes, pipe culverts and fittings required to complete the project. The CONTRACTOR shall furnish all equipment, tools, labor and materials necessary to complete the work in accordance with the plans and specifications.

1.1 RELATED WORK

Any reference to standard specifications refers to the most current published date of the following specification unless otherwise noted.

1.2. Reference the following specifications for related work:

ASTM C76 Concrete Pipe

ASTM C507 Reinforced Concrete Elliptical Pipe

1.2.1. All drainage structures and inlets shall conform to, and installed in conformance with, the “Standard Specifications for Highway Construction” latest edition, published by the South Carolina Department of Transportation.

1.3. The CONTRACTOR shall furnish all equipment, tools, labor, and materials necessary to complete the work in accordance with the plans and specifications.

PART TWO – MATERIALS:

2.1. Drainage pipe and culverts shall conform to local and state Department of Transportation requirements.

2.2. Shop drawings consisting of catalog cuts and related data shall be submitted by the CONTRACTOR to the ENGINEER for approval.

2.3. All reinforced concrete pipe, flared end sections, tees and elbows shall be clearly marked showing the pipe class, type of wall and date of manufacture.

2.4. Reinforced concrete drainage pipe shall conform to ASTM C76, Class III, wall thickness B. Joints shall be tongue and groove.

2.5. Concrete flared end sections shall be reinforced. Concrete used in flared end sections shall attain a compressive strength of 3500 psi at 28 days.

2.6. Reinforced concrete elliptical drainage pipe shall conform to ASTM C507, Class HE-II. Joints shall be tongue and groove.

PART THREE – INSTALLATION:

3.1. GENERAL REQUIREMENTS

3.1.1. Drainage pipes and culverts of the type and quantity and in the locations as called for on the plans or as directed by the ENGINEER shall be installed in conformance with local and state Department of Transportation requirements.

3.1.2. Where proposed culverts are to be installed under existing roadways, the construction shall be performed in such a way that half the roadway will be maintained and available to traffic or as directed by the governing agency.

3.2. Unloading and Handling

All pipes shall be unloaded and handled with reasonable care. When any joint or section of pipe is damaged during unloading or handling, the undamaged portions of the joint or section may be used where partial lengths are needed or, if damaged sufficiently, the ENGINEER will reject the joint or section as being unfit for installation and the CONTRACTOR shall remove such rejected pipe from the project, at no cost to the OWNER.

3.3. PREPARATION OF PIPE FOUNDATION

3.3.1. The pipe foundation shall be prepared in accordance with the applicable method shown on the plans and shall be true to line and grade and uniformly firm. Bedding material shall be placed and shaped beneath the pipe. The pipe foundation shall be shaped to fit the outside of the pipe for at least 10% of its outside diameter under all pipe culverts. Where bell and spigot type pipe is used, recesses shall be excavated to receive the pipe bells.

3.3.2. Where the foundation material is found to be of poor supporting value or of rock, the ENGINEER may make minor adjustment in the location of the pipe to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned by removing the existing foundation material by undercutting to the depth as directed by the ENGINEER, within the limits established on the plans, and backfilling with either a suitable local material secured from unclassified excavation or borrow excavation at the nearest accessible location within the project, or foundation conditioning material consisting of crushed stone or gravel or a combination of sand and crushed stone or gravel approved by the ENGINEER as being suitable for the purpose intended. The selection of the type of backfill material to be used for foundation conditioning will be made by the ENGINEER.

3.3.3. When necessary, the CONTRACTOR shall provide for the temporary diversion of water or dewatering in order to maintain the pipe foundation in a dry condition, and shall continue to maintain the trench in a dry condition until backfill and compaction activities are complete.

3.4. LAYING PIPE

3.4.1. Rigid pipe shall be carefully laid on the prepared foundation, bell or groove end upgrade with the spigot or tongue fully inserted and each joint checked for alignment and grade as the work proceeds. Flexible plastic joint material shall be used. Joint material of other type or design may

be used when designated on the plans, by special provisions, or when permitted in writing by the ENGINEER.

3.4.2. Flexible pipe (except structural plate pipe) shall be carefully placed on the prepared foundation starting at the downstream end with the inside circumferential laps pointing downstream and with the longitudinal laps at the side or quarter points.

3.5. BACKFILLING

3.5.1. The fill around the pipe shall be placed in accordance with the applicable method shown on the plans, and shall be placed in layers not to exceed 6 inches loose unless otherwise approved by the ENGINEER and compacted to the density required. Select backfill material shall be used when called for on the plans.

3.5.2. Care shall be taken during backfill and compaction operations to maintain alignment and prevent damage to the joints. The backfill shall be kept free from stones, frozen lumps, chunks of highly plastic clay, or other objectionable material.

3.5.3. All pipe backfill areas shall be graded and maintained in such a condition that erosion or saturation will not damage the pipe bed or backfill.

3.5.4. Heavy equipment shall not be operated over any pipe until it has been properly backfilled and has a minimum cover as required by the plans. Where any part of the required cover is above the proposed finish grade, the CONTRACTOR shall place, maintain, and finally remove such material at no cost to the OWNER. Pipe which becomes misaligned, shows excessive settlement, or has been otherwise damaged by the CONTRACTOR's operations shall be removed and replaced by the CONTRACTOR at no cost to the OWNER.

3.6. MAINTENANCE

3.6.1. The CONTRACTOR shall maintain all pipe installations in a condition such that they will function continuously from the time the pipe is installed until the project is accepted.

3.6.2. The ENGINEER may require the CONTRACTOR to thoroughly clean out and maintain all existing pipe and drainage structures at his own expense when necessary erosion control measures not taken by the CONTRACTOR resulted in fouling existing drainage systems.

3.7. REINFORCED CONCRETE PIPE

3.7.1. Reinforced concrete drainage pipe shall be installed so as to prevent damage to the pipe. Joints shall be mortar or packing type, and shall be close fitting and generally watertight. Elliptical pipe shall be installed with the major axis horizontal.

3.8. CORRUGATED STEEL PIPE

3.8.1. Bituminous coated corrugated steel pipe and paved invert pipe shall be handled with special care to avoid damage to coatings. Paved invert pipe shall be installed with the paved invert centered on the bottom.

3.8.2. The pipe sections shall be joined with coupling bands, fully bolted and properly sealed. Coupling bands for annular and helical corrugated metal pipe shall provide circumferential and longitudinal strength sufficient to preserve the alignment, prevent separation of the sections, and prevent infiltration of backfill material.

3.8.3. All pipe 72 inches or larger in diameter shall be wire braced at the place of fabrication to retain its shape while being handled, installed, and backfilled. Wire bracing shall be removed by the CONTRACTOR when no longer needed.

3.9. CORRUGATED ALUMINUM PIPE

3.9.1. The pipe sections shall be joined with coupling aluminum bands, fully bolted and properly sealed. Coupling bands for annular and helical corrugated aluminum pipe shall provide circumferential and longitudinal strength sufficient to preserve the alignment, prevent separation of the sections, and prevent infiltration of backfill material.

3.9.2. All pipe 72 inches or larger in diameter shall be wire braced at the place of fabrication to retain its shape while being handled, installed, and backfilled. Wire bracing shall be removed by the CONTRACTOR when no longer needed.

3.10. CORRUGATED STEEL AND CORRUGATED ALUMINUM ALLOY, STRUCTURAL PLATE PIPE AND PIPE ARCH

3.10.1. Erection shall be in accordance with the manufacturer's assembly diagrams and instruction sheets. All erection procedures and methods shall meet with the approval of the ENGINEER. All structural plate shall be handled with reasonable care. The plate shall not be dragged or skidded. If the spelter coating has been broken during handling or backfilling operations, the plate or the assembled pipe or pipe arch will be rejected, or shall be repaired as directed by the ENGINEER.

3.10.2. The entire pipe line shall be completely assembled before any backfill is placed, unless otherwise permitted by the ENGINEER. Elongated pipe shall be erected with the long diameter in a vertical position. Should spiraling occur during erection, the bolts shall be loosened and the pipe assembly adjusted to the correct position.

3.10.3. All bolting shall be done in a careful and workmanlike manner in accordance with the procedure specified by the manufacturer and approved by the ENGINEER before backfill is placed. All nuts shall be tightened to a minimum of 100 foot-pounds and a maximum of 200 foot-pounds of torque. Nut tightness shall be checked with a properly calibrated torque wrench before, during, and after backfill is placed.

3.10.4. Where necessary, the invert grade shall be cambered by an amount sufficient to prevent the development of sag or back slope in the flow line. The amount of camber used will be determined by the ENGINEER.

3.10.5. First class workmanship shall be used in installing the pipe and pipe arch. Evidence of defective workmanship shall include but not be limited to the following.

- Uneven laps
- Improper shaping
- Variation from a straight center line
- Ragged edges
- Loose, unevenly lined or spaced bolts
- Illegible identification stamp on any plate
- Bruised, scaled or broken spelter coating
- Dents or bends in the metal itself

3.10.6. Defective workmanship may constitute sufficient cause for rejection of the completed or partially completed work, or of any materials proposed for use in the work.

(End of Section 02722)

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PART ONE - GENERAL:**1.01 - SCOPE**

This section covers the furnishing, installation, testing and adjustment of an underground sprinkler system. The irrigation system shall be installed by a contractor who specializes in irrigation installation. The contractor shall provide the owner with an irrigation plan for review. After the Irrigation plan is approved by the owner the contractor shall furnish a unit price for each type of head, fitting, pipe, etc. furnished, installed, guaranteed, etc. for the purpose of increasing or decreasing quantities.

1.02 - LINES AND GRADES

The contractor shall provide his own lines and grades for this work, and he shall have someone on the site during installation that is familiar with all aspects of irrigation systems.

1.03 - SAFETY CODES AND STANDARDS

Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction. No water from the irrigation system shall cover or land on any walkway, hardscape surface or roadway.

1.04 - EXISTING UTILITIES

Locate existing underground utilities by careful hand excavation. Utilities are to remain in place; provide protection from damage during ditching operations. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the owner immediately for direction as how to proceed. Cooperate with the utility company in keeping respective service and facilities in operation. Repair damaged facilities to the satisfaction of the utility company.

1.05 - PROTECTION OF PERSONS AND PROPERTY

Barricade open excavation and post with warning lights for safety of persons. Operate warning lights during hours from dusk to dawn each day. Protect structures, utilities, driveways, pavements, and other facilities immediately adjacent to excavation from damage caused by settlement, lateral movement, undermining, washout or other hazards. Take precautions and provide necessary bracing and shoring to guard against movement or settlement of existing improvements. The contractor is entirely responsible for the strength and adequacy of bracing and shoring and for the safety and support of construction from damage or injury caused by the lack thereof or by movement or settlement.

1.06 - MATERIALS STORAGE

Stockpile materials where directed. Locate and retain materials away from edge of excavations, even though such excavations may be sheeted and braced, to prevent such material from falling or sliding into excavation to prevent cave-ins.

PART TWO - PRODUCTS:

2.01 - MATERIALS STORAGE

This section covers the furnishings and installation of heads, fittings, pipes, backflow preventers and all other materials shown on the plans or their equivalent. All material shall be new and free of defects.

2.02 - SURPLUS MATERIALS

Remove and dispose of surplus materials from the site at no additional cost to the owner.

PART THREE - EXECUTION:

3.01 - COORDINATION

Coordinate work with the owner and any other trades on the project to avoid possible conflicts. Before installation is started, the ground shall be within approximately two inches, plus or minus, (2"±) of finished grade.

3.02 - LAYOUT

The arrangement of the system is shown on the plan. If any rearrangement of system is required, submit a drawing to the owner for approval before proceeding with installation.

3.03 - INSTALLATION OF PIPE

Install pipe in straight runs, without sags and graded for drainage according to applicable code. Cut pipe ends straight, cleanse of dirt before assembly. Lay pipes in trenches, bottoms tamped hard without soft spots.

3.04 - TEST AND INSPECTIONS

Upon completion of tests and inspections, backfill with materials free of rocks and debris; trenches backfilled in six inch (6") layers with each layer tamped firmly. Remove excess earth from the site.

END OF SECTION

PART ONE - GENERAL

1.1 – Limits of Work

All areas disturbed by grading and construction operations except as covered by surface construction or where noted on the plans, including the areas where surplus material is stockpiled, shall be put into perennial vegetation by seeding for temporary grassing and sodding as directed on the plans. If not directly noted on the plans then revegetation shall be by sodding.

1.2 - Scope

The type of work required includes the following: Fine grading and preparation of grass areas, seeding, and sodding.

1.3 – Lines and Grades

The CONTRACTOR shall provide his own lines and grades for the work required.

1.4 – Standards and Specifications

Generally, materials and methods shall conform to the South Carolina State Highway Department Standard Specifications for Highway Construction, latest edition and as specified herein.

1.5 - Submittals

Submit five (5) copies of type written instructions recommending procedures to be followed by the OWNER for proper maintenance and care of grasses. Submit proof that all materials meet the requirements of this section. Bag tag figures will be evidence of purity and germination of seed. No seed will be accepted with a date of test of more than nine (9) months prior to date of use. Where fertilizer is furnished from bulk storage, the CONTRACTOR shall furnish a supplier's certification of weight and analysis.

PART TWO - PRODUCTS

2.1 – Grass Seed

Provide fresh, clean, new crop seed complying with the tolerance for purity and germination established by the Official Seed Analysis of North America and certified by the Seed Certification Department of Clemson University, as follows:

- A. PENNISETUM GLAUCUM (Browntop Millet)

Testing ninety-eight percent (98%) purity and eighty-five percent (85%) germination.

- B. CYNODON DACTYLON (Bermudagrass) / or EREMOCHLOA OPHIUOIDES (Centipede) – see plans

Testing ninety-eight percent (98%) purity and eighty-five percent (85%) germination.

- C. LOLIUM MULTIFLORUM (Domestic Italian Rye)

Testing ninety-eight percent (98%) purity and ninety percent (90%) germination.

2.2 – Other Planting Materials

Provide the following materials, all meeting or exceeding regulations of the South Carolina State Department of Agriculture, as follows:

- A. Fertilizer: 15-15-15 (50% organic) with trace elements.
- B. Basic Slag: Standard Grade.
- C. Agricultural Sulfur: Standard Grade.

2.3 – Special Requirements

Where construction activities are stopped in an area for over fourteen (14) days, the entire area must be vegetated temporarily or permanently. This shall be in accordance with the requirements as outlined in the "NPDES General Permit for Stormwater Discharge from Construction Activities that are Classified as Associates with Industrial Activity" by EPA Regulations Permit No. SCR100000. This is in addition to the requirements for a permanent grass cover and shall be at no additional cost to the OWNER

. The CONTRACTOR shall make every effort to complete permanent grassing operations at the earliest practical date in order to complete a grass cover sufficient to protect the site from wind and water erosion.

PART THREE - EXECUTION

3.1 – Planting Seasons

Summer dates are:

3/15 to 9/1 for hulled Bermuda and unhulled Bermuda

5/15 to 9/1 for Browntop Millet

Winter dates are:

9/1 to 3/15 for unhulled Bermuda.

9/1 to 5/15 for Common Rye.

3.2 – General Requirements

A. Equipment

Equipment required for proper execution of these operations shall be present on the job site and in good working order.

B. Maintain Grades

Maintain grades in a true and even condition, including necessary repairs to previous grades and topsoiled areas.

3.3 – Soil Preparation

Limit preparation to areas which will be planted in the near future.

A. Fine Grading

Fine grade all areas to receive grassing. Care shall be taken not to disturb existing trees. Perform this work only during period of favorable weather.

B. After Fine Grading

After fine grading, clean surface of all stones and other objects larger than one inch (1") in any direction. Also, remove roots, sticks, grade stakes and other extraneous matter.

C. Aerate and Disc

Aerate and disc to a depth of three inches (3") to four inches (4") to promote acceptance and germination of seeds.

3.4 - pH Reading

Test pH reading. If reading is below 6.0, adjust to that level with an application of slag; if reading is above 6.5, adjust to that level with an application of sulfur. The testing laboratory shall be by Clemson University Soil Testing Laboratory or a laboratory approved by the Extension Service.

3.5 - Initial Application of Fertilizer

A. Flat Areas

Apply at rate of eight pounds (8lbs.) per 1,000 square feet. Distribute fertilizer and slag or sulfur uniformly over areas incorporating into soil to a depth of two inches (2") by means of hand raking, harrowing, or other approved method. At the CONTRACTOR's option, this operation may be combined with topsoil spreading specified above. NOTE: No pure nitrogen shall be applied.

B. Slopes and Swales

Combine with grassing operations as specified below. Correct any surface irregularities resulting from this operation by hand raking if necessary, and perform any other required "clean up" work before planting is begun.

3.6 - Planting

A. Temporary Lawn Seed (per 1,000 square feet)

Eight pounds (8 lbs.) of fertilizer, 15-15-15; five pounds (5 lbs.) rye grass seed; nine ounces (9 oz.) unhulled bermudagrass seed, thirty-five pounds (35 lbs) of wood fiber, one-gallon (1 gal.) tac material mixed with water.

B. Sodding

Sod shall be viable, weed free and recently harvested. Sod shall be placed on the prepared topsoil. The surface on which sod is to be laid shall be firm and free of footprints. Begin by placing sod along a straight edge and work outward. Sod of the next course shall be matched against the edge of the first line in such a way that the joints between the individual sod pieces do not coincide. Successive courses are matched against the last line laid, in the same manner. The joints shall be closely laid, filled with topsoil and rolled lightly. Surface sod shall be smooth and free of depressions.

C. Establish Lawns

It is the responsibility of the CONTRACTOR to establish a complete vegetative cover with viable healthy plants.

D. Seeding for Temporary Erosion Control Only (per 1,000 square feet)

August 1 to April 1: Three pounds (3lbs.) of rye grass seed and four pounds (4lbs.) of fertilizer.

April 1 to August 1: One-half pound (1/2lb.) browntop millet seed and four pounds (4lbs.) of fertilizer.

3.7 - Maintenance

A. Begin maintenance immediately after any lawn area is planted and continue until the completion of the project.

B. Maintain Lawns

Maintain lawns by weeding, cultivating, mowing at least twice, trimming, hydroseeding, seeding, or re-sodding and other operations such as re-grading and re-planting as required to establish an acceptable stand of grass.

C. Provide Adequate Protection

Provide adequate protection at all times for all grass areas. Lay or place planks over grass for the movement of heavy materials or equipment.

D. Repair or Replace

Repair or replace, at no additional cost to the OWNER, any portion of grassed areas not in good viable condition if so determined by the OWNER before or on the date of completion for work done prior to that time.

3.8 - Acceptance

Lawns will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, uniform stand of specified grass is established, free of weeds, bare spots and surface irregularities. A full stand of grass is not required where irrigation has not been installed.

(End of Section 02820)

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PART ONE - GENERAL:**1.01 - SCOPE**

This section includes furnishing all materials, equipment, and labor necessary for the installation of trees and shrubs; protection, maintenance, guarantee and replacement of plants; and all related items required to complete the work shown on the drawings and as specified. The contractor shall furnish a unit price for each type of plant specified for the purpose of adding or deleting plants. The price shall be the same for adding or deleting plants. The price shall include the total cost for furnishing each plant and installation, complete to include mulch. The unit price shall be the same for additions and deletions in bid quantities.

Existing plant material that is to remain shall be thinned, pruned, and all weeds, vines, trash, etc., removed. These plants shall be fertilized the same as for new plantings.

PART TWO - PRODUCTS:**2.01 - TOPSOIL**

Topsoil shall be tested for the pH and corrected, if necessary, before planting operations are started. Test results shall be submitted to the Owner/Landscape Architect prior to beginning planting operations.

2.02 - TOPSOIL TO BE FURNISHED

The contractor shall furnish, at his expense, additional topsoil to properly install all work as specified and as shown on the drawings. The contractor shall provide a soil analysis and report for any area which topsoil is to be stripped and used for this project. Topsoil shall have a "high" rating in each of the basic nutrients tested and a pH ranging from 6.0 to 6.5. Necessary additives shall be incorporated in a proper quantity as recommended in the soil analysis or as necessary to bring the soil supplied up to standards specified. Topsoil shall be from naturally well drained areas. It shall be classified as a loam, silt loam, clay loam or a combination thereof, as determined from the Bureau of Plant Industry, Soils and Agricultural Engineering, USDA triangular soil texture chart. Topsoil shall be without admixture of subsoil and shall be clean.

2.03 - BASIC SLAG AND AGRICULTURE SULPHUR

Basic slag and agricultural sulfur (for correcting soil pH) shall be standard grade.

2.04 - COW MANURE OR SLUDGE

Cow manure shall be heat treated, weed seed free, and commercially bagged.

2.05 - COMMERCIAL FERTILIZER

Commercial fertilizer shall be 15-15-15 (50% organic) formula with trace elements and shall conform to the applicable State Fertilizer Laws. It shall be uniform in composition, dry and free flowing and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

2.06 - PEAT

Peat shall be a domestic product consisting of partially decomposed vegetable matter of natural occurrence. It shall be brown, clean, low in content of mineral and woody material, mildly acidic and granulated or shredded.

2.07 - MULCH

Pine straw mulch mix shall be used. Mulch shall be a minimum of 3" depth.

2.08 - WATER

The contractor may use the owner's water if it is available. The contractor shall insure that an adequate supply of water is available for the planting. The contractor shall furnish all necessary hoses, equipment, attachments and accessories for the adequate irrigation of planted areas.

2.09 - PLANT MATERIALS

A. Plants

Plants are shown on the drawings with sizes and spacing.

B. Nomenclature

The names of plants required under this contract conform to those given in Standard Plant Names, latest edition, prepared by American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform generally with names accepted in the nursery trade.

C. Quantities

Quantities are shown for information only. The contractor is responsible for calculating his own quantities. If there is a conflict between quantities and spacing, spacing shall prevail.

D. Quality and Size

Plants shall have a habit of growth that is normal for the species and shall be sound, healthy and free from insect pests, plant diseases and injuries. All plants shall equal or exceed the measurements specified in the plant list, which are minimum

acceptable sizes. They shall be measured before pruning, with branches in normal position. Any necessary pruning shall be done at time of planting; however, no plants supplied under this contract shall be pruned back to such extent that it no longer meets specifications. Requirements for the measurement, branching, grading, quality, balling and burlapping of plants in the plant list generally follow the code of standard currently recommended by the American Association of Nurserymen, Inc., in the latest edition of the American Standard for Nursery Stock.

E. Substitution

Substitution will be permitted only upon submission of proof that any plant is not obtainable within four hundred (500) miles of the site and authorized by the owner of a changed order providing the use of the nearest equivalent obtainable size or variety of plant having the same essential characteristics with an equitable adjustment of contract price.

2.10 - TYPE OF PROTECTION TO ROOTS

A. Balled and Burlapped Plants

Plants designated "B & B" in the plant list shall be balled and burlapped. They shall be dug with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary over all be firmly wrapped with burlap or similar material and bound with twine, cord or wire mesh. Where necessary to prevent breaking or cracking of the ball during the process of planting, the ball may be secured to a platform.

The balls of "B & B" plants which cannot be planted immediately on delivery, shall be covered with moist soil or mulch, or other protection from drying winds and sun.

B. Container Plants

Container grown plants in cans or pots or equal quality as balled and burlapped plants may be substituted in lieu thereof. The plants in the containers shall be delivered to the site and remain in the containers until planted. Plants in containers that are severely root bound shall not be acceptable. All plants shall be carefully removed from their containers in such a manner not to injure the roots.

2.11 - SAMPLES, TESTS AND INSPECTIONS

A. Notice of Sources

Within ten (10) days following acceptance of the bid, the owner shall be notified of the sources of the materials required or desired to be inspected or tested.

B. Topsoil to be Furnished:

The owner reserves the right to inspect the topsoil to be furnished, to determine

whether or not it meets the requirements specified, and approve the depth to which it may be stripped. At the time of inspection, the contractor shall be required to take representative soil samples from several locations in the area under consideration. Tests shall be conducted by a State or Commercial Soil Testing Laboratory using methods approved by the Association of Official Agricultural Chemists or the State Agricultural Experimental Station. Delivery of topsoil may begin after approval of the sample. Soil test results shall be submitted to the Owner/Landscape Architect prior to beginning planting operations.

C. Plants

The contractor shall be responsible for all certificates of inspection of plant materials that may be required by Federal, State or other authorities to accompany shipments of plants. Inspection of plants to be balled and burlapped may be made at the place of growth. All plants must be inspected and approved before they are planted. Inspection and approval by the owner of plants at the place of growth or upon delivery shall be for quality, size and variety only and shall not in any way impair the right of rejection for failure to meet other requirements during progress of this work.

PART THREE - EXECUTION:

3.01 - TIME OF PLANTING

It is the responsibility of the contractor to coordinate all phases of the planting. Planting operations shall be conducted under favorable weather conditions during the next season or seasons which are normal for such work. At the option and on the full responsibility of the contractor, planting operations may be conducted under unseasonable conditions without additional compensation.

3.02 - SPRAYING

Plant material shall be sprayed, as may be necessary to control diseases and insects and to prevent their spread to other plantings. Materials and methods employed shall be as are commonly used to control the diseases and pests found present and shall not be injurious to person or structures.

3.03 - PRUNING AND REPAIR

Upon completion of the work under this contract, all trees and shrubs shall be pruned and any injuries repaired. The amount of pruning shall be limited to the minimum necessary to remove dead or injured twigs and branches and to compensate for the loss of roots as a result of transplanting operations. Pruning shall be done in such a manner as not to change the natural habit or shape of the plant, however, no plants applied under this contract shall be pruned back to such extent that it no longer meets specifications. All cuts shall be made flush, leaving no stubs. On all cuts over three-fourths inch (3/4") in diameter and bruises or scars on the bark, the injured cambium shall be traced back to living tissue and removed; wounds shall be smoothed and shaped so as not to retain water and the treated area shall be coated with an acceptable tree wound paint.

3.04 - OBSTRUCTION BELOW GROUND OR OVERHEAD

- A. It is not contemplated that planting shall be done where the depth of soil over underground construction and obstructions is insufficient to accommodate the roots or where pockets of impervious soil will require drainage. Where such conditions are encountered in excavation of planted areas and where the obstruction cannot be removed by hand methods in the course of digging plant pits of the usual size, and where trees to be planted are found to be under overhead wires, other locations for plant material may be designated by the owner.
- B. Removal of underground obstructions, relocation of construction and provision of drainage for planting areas shall be done only as directed by the owner.
- C. If changes in the location of the work, or if the removal of obstructions involves additional work, the contractor shall not proceed until authorized in writing by the owner.

3.05 - NEW PLANTING

- A. Layout

New plantings shall be located where shown on the plans except where obstructions below ground or overhead are encountered or where changes have been made in the construction. If adjustments are necessary they shall be made only after approval by the Owner or Landscape Architect. No planting shall be placed closer than one foot (1') to pavements or structures except where indicated.

- B. Planting Pits

Reasonable care shall be exercised to have pits dug and soil prepared prior to moving plants to their respective locations for planting to insure that they will not be unnecessarily exposed to drying elements or physical damage. Circular pits with vertical sides shall be excavated for all plants, except for hedge and plants specifically designated on the plans to be planted in beds. Diameter of pits for plant material, trees, and shrubs shall be at least twice the width of the diameter of the ball or spread roots. The depth of pits for trees and shrubs shall be enough to accommodate the ball or roots when the plant is set to finished grade allowing for compacted, prepared soil in the bottom of the pit.

- C. Percolation Tests

Subsurface drains have not been included as part of the project, therefore, the contractor shall make such percolation tests as may be necessary to determine if subsurface drainage conditions in landscape areas are so poor as to support moisture conditions potentially fatal to plantings. The following procedure is recommended:

1. Wait at least twenty-four (24) hours after rain and dig test pit twelve inches (12") square or twelve and one-half inches (12-1/2") in diameter to depth of

bottom of plant trench or pit; remove all loose soil (if standing water is visible, notify the owner).

2. Quickly fill bottom with six inches (6"), approximately three and one-fourth gallons (3-1/4 gal.) of water.
3. Record length of time from filling until disappearance of water and divide number of minutes by six (6) to give average time of one inch (1") fall.
4. Compare one inch (1") fall time with the following table:
 - a. One inch (1") in zero to three (0 - 3) minutes indicates rapid absorption.
 - b. One inch (1") in three to five (3 - 5) minutes indicates medium absorption.
 - c. One inch (1") in five to thirty (5 - 30) minutes indicates slow absorption.
 - d. One inch (1") in over sixty (60) minutes indicates impervious soil.
5. If test indicates soil to be semi-impervious or impervious, or if water is initially found in test pit, notify the owner in writing before proceeding further.
6. If the contractor does not make tests at representative locations and file records or results with the owner, or if he plants in areas shown to have poor drainage without a written release from the owner, he shall be liable for any further guaranteed replacements due to subsurface water damage.
7. If the contractor makes proper tests and files complete records indicating semi-impervious soil or worse conditions, he will not be held responsible for future subsurface water damage to work of this contract. The owner may observe the testing at any time, and shall be informed in advance of the time and place of testing.

D. Planting Mixture

Soil used in planting shall be topsoil, as herein before specified, or suitable existing soil, either of which shall be thoroughly mixed with one (1) part peat and one (1) part manure to five (5) parts soil. Very poor soils, grave, hardpan or other soil injurious to plants shall not be used. Except for ericaceous plants, very acidic or sour soil (having a pH of less than six {6}) shall be thoroughly mixed with sufficient slag to produce a slightly acid reaction (a pH of 6.0 to 6.5). Soil used in planting shall be thoroughly mixed with five pounds (5 lbs.) of 16-4-12 (50% organic) formula commercial fertilizer per cubic yard.

E. Excess Soil

Excess excavated soil from planting operations shall be disposed off the site or as directed by the owner.

F. Setting Plants

Unless otherwise specified, all plants shall be planted in pits, centered, and set on compacted planting mixture to such a depth that the finished grade level at the plant after settlement will be the same as that at which the plant was grown. They shall be planted upright and faced to give the best appearance or relationship to adjacent structures. No burlap shall be pulled from under the balls. Platform wire and surplus binding from top and sides of the balls shall be removed. Roots shall be spread in their normal position. All broken or frayed roots shall be cut off evenly. Planting mixture shall be placed and compacted carefully to avoid injury to roots and to fill all voids. When the hole is nearly filled, add water as necessary and allow it to soak away. Fill the holes to finished grade and form a shallow saucer around each plant by placing settles, additional soil shall be filled in to the level of the finished grade.

G. Mulching

All plants shall be mulched with a three inch (3") layer of pine straw within two (2) days after planting. This mulch shall entirely cover the area of the planting pit, bed, or saucer around each plant.

3.06 - MAINTENANCE

Maintenance shall begin immediately following the last operation of installation for each plant and shall continue in accordance with the following requirements: New planting shall be protected and maintained until installation of all planting is completed plus a minimum of ninety (90) days. Maintenance shall include watering, weeding, cultivating, mulching, removal of dead material, re-inserting plants to proper grades or upright position and restoration of the planting saucer, re-staking or additional staking and other necessary operations. If planting is done after lawn preparation, proper protection to lawn areas shall be provided and any damage resulting from planting operations repaired promptly.

3.07 - INSPECTION FOR ACCEPTANCE

A. Substantial Completion

Substantial completion is determined when installed material is alive and in a healthy condition.

B. Inspection

Inspection of the work of planting to determine completion of contract work will be made by the owner at the conclusion of the maintenance period upon written notice requesting such inspection submitted to the owner at least ten (10) days prior to the anticipated date.

C. Acceptance

After inspection, the contractor will be notified by the owner of acceptance of all work of this section, or, if there are any deficiencies, of the requirements for completion of the work. Maintenance or other work remaining to be done shall be subject to re-inspection before acceptance. Maintenance of all work will be required by the contractor until the entire plantings have been accepted by the owner.

D. Acceptance In Part

The work of planting may be accepted in part by the owner upon written acceptance by the owner clearly stating the portion accepted and the conditions of the acceptance. This in no way voids the replacement on plants under "Plant Guarantee and Replacement".

3.08 - PLANT GUARANTEE AND REPLACEMENT

A. Guarantee

Ten percent (10%) of the Contract Price shall be withheld for a period of twelve (12) months from acceptance to ensure replacement of plant material not meeting the guarantee. Provided that plants are maintained in accordance with the contractor's maintenance schedule, plants shall be guaranteed for one (1) year and shall be alive and in satisfactory growth at the end of the guarantee period.

B. The contractor shall provide the owner with a written detailed outline for maintenance for the first year. This shall cover all plant requirements needed to assure healthy material at the conclusion of the guarantee period.

C. Replacement

At the end of the guarantee period, inspection will be made by the owner upon written notice requesting such inspection submitted by the contractor at least ten (10) days before the requested date. Any plant required under this contract that is dead or not in satisfactory growth, as determined by the owner, shall be removed from the site; these and any plants missing due to the contractor's negligence, shall be replaced as soon as conditions permit, but during the normal planting season. At the successful completion of this work the ten percent (10%) retention shall be released.

D. Materials and Operations

All replacements shall be plants of the same kind and size as specified in the plant list. They shall be furnished and planted as specified under "New Planting". The cost of such replacements shall be borne by the contractor.

E. The contractor shall visit the site on his own schedule during the one (1) year guarantee period to determine if proper maintenance is being conducted. If the contractor determines that the owner is not performing proper maintenance, then he shall outline in writing, in detail, his concerns.

3.09 - SUBMITTALS

The contractor shall submit results of pH tests and his plans for correcting the pH to the owner and the results of the percolation tests prior to beginning planting operations.

(End of Section 02830)

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PART ONE – DESCRIPTION:

The work covered by this section consists of furnishing all labor, materials, and equipment to perform all necessary operations to topsoil, fine grade, fertilize, mulch and maintain temporary and permanent seeding of all graded, cleared, or disturbed areas during construction. The work covered by this section shall be in conformance with the latest version of local and state Department of Transportation requirements.

1.1. Related Work

See following sections for related work.

02110	Clearing and Grubbing
02210	Unclassified Excavation and Grading
02270	Erosion and Sediment Control
SS-A617A	FS Liquid Mulch Binder

1.2 References

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specification or regulation unless otherwise noted.

The work covered by this section shall be in conformance with Section 810 of the “Standard Specifications for Highway Construction” dated 2007, published by the South Carolina Department of Transportation and the Sediment Control handbook as published by EQC, Bureau of Water, SC Department of Health and Environmental Control.

PART TWO – MATERIALS:**2.1. Topsoil**

Topsoil shall be from stockpiles created from stripping and required excavation. Should additional topsoil be required in excess of that obtained from stripping and excavation, the contractor shall obtain material from other sources on the site where authorized by the OWNER, or from approved sources off the site. The topsoil shall be natural, friable soil, possessing characteristics of representative soils in the vicinity which produce heavy growths of crops of grass. It shall be obtained from naturally well-drained areas, shall be reasonably free from subsoil, brush, objectionable weeds, and other litter and shall be free from toxic substances, clay lumps, stones, roots and other objects larger than 1 inch in diameter, or any other material which might be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.

2.2. Fertilizer

Fertilizer shall be the product of an approved commercial fertilizer manufacturer and shall be 5-10-5 grade, uniform in composition, free-flowing material suitable for application with approved standard equipment. The fertilizer shall conform to the applicable State fertilizer laws and shall be delivered to the site in bags or other convenient containers each fully labeled and bearing the name, trademark, and warranty of the producer.

2.3. Lime

Lime shall be ground limestone containing not less than 85% of total carbonates and shall be ground to such fineness that at least 50% will pass through a 100-mesh sieve and at least 90% will pass through a 20-mesh sieve. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing the 100-mesh sieve, but no additional payment will be made for the increased quantity.

2.4. Mulch

Mulch shall be straw from wheat or oats. Materials for securing mulch may be one of the following.

- Mulch Netting: Lightweight plastic, cotton, jute, wire or paper nets shall be used.
- Peg and Twine: Baling twine and soft wood pegs 1/2" x 1" x 12".
- Liquid Mulch Binder: RC-2 cut back asphalt conforming to the requirements of Federal Specifications SS-A671A, and asphalt emulsion shall conform to the requirements of Federal Specification SS-A-674, Type V.
- Seed: Seed used shall conform to all state laws and regulations of the SCDA. Seed that has become wet, moldy, or otherwise damaged in transit or storage will not be acceptable. The seed used shall be that shown in seeding schedule specified herein or on the plans.

PART THREE – INSTALLATION:

3.1. Seedbed Preparation

3.1.1. Clearing

Prior to or during grading and tillage operations, the ground surface shall be well drained, cleared of all brush, roots, stones larger than 2 inches in diameter, or any other material which may hinder proper grading, tillage, or subsequent maintenance operations.

3.1.2. Fine Grading

Areas to be seeded shall be graded as shown on the drawings or as directed and all surfaces shall be left in an even and properly compacted condition so as to prevent the formation of depressions where water will stand. Areas to be topsoiled shall be graded to a smooth surface and to a grade that will allow topsoiling to finished grade.

3.1.3. Topsoiling

Immediately prior to placing topsoil, the subgrade, where excessively compacted by traffic or other causes, shall be loosened by scarifying to a depth of at least 2 inches to permit bonding of the topsoil to the subgrade. Topsoil shall be uniformly spread by approved equipment in sufficient quantity to provide a compacted layer of 4 inches in thickness over the designated areas and in such manner that planting can proceed with little additional soil preparation or tillage. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to the proposed planting or to proper grading. Topsoil shall be graded to the lines indicated or as directed and any irregularities in the surface resulting from topsoiling or other operations shall be corrected to prevent formations of depressions where water will stand.

3.1.4. Tillage

After topsoiled areas required to be seeded have been brought to the grades shown on the plans and as specified, they shall be thoroughly tilled to a depth of 3 inches by approved methods, until the condition of the soil is acceptable to the ENGINEER. Any objectionable undulations or irregularities in the surface resulting from tillage or other operations shall be removed before planting operations are begun. The work shall be performed only during periods when satisfactory results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture or other factors, that results are not likely to be satisfactory, the ENGINEER will stop the work and it shall be resumed only when, in his opinion, the desired results are likely to be obtained.

3.2. Limestone, Fertilizer and Seed

3.2.1. General

Seasonal limitations for seeding operations, the kinds and grades of fertilizers, the kinds of seed, and the rates of application of limestone, fertilizer, and seed shall be as shown in the seeding schedule.

3.2.2. Equipment to be used for the application, covering, or compaction of limestone, fertilizer, and seed shall have been approved by the ENGINEER before being used on the project. Approval may be revoked at any time if equipment is not maintained in satisfactory working condition, or if the equipment operation damages the seed.

3.2.3. Limestone, fertilizer, and seed shall be applied within 24 hours after completion of seedbed preparation unless otherwise permitted by the ENGINEER, but no limestone or fertilizer shall be distributed and no seed shall be sown when the ENGINEER determines that weather and soil conditions are unfavorable for such operations.

3.2.4. During the application of fertilizer, adequate precautions shall be taken to prevent damage to structures or any other appurtenances. The CONTRACTOR shall either provide adequate covering or change methods of application as required to avoid such damage. When such damage occurs, the CONTRACTOR shall repair it, including any cleaning that may be necessary.

3.3. Limestone and Fertilizer

Limestone may be applied as a part of the seedbed preparation, provided it is immediately worked into the soil. If not so applied, limestone and fertilizer shall be distributed uniformly over the prepared seedbed at a specified rate of application and then harrowed, raked, or otherwise thoroughly worked or mixed into the seedbed.

3.3.1. If liquid fertilizer is used, storage containers for the liquid fertilizer shall be located on the project and shall be equipped for agitation of the liquid prior to its use. The storage containers shall be equipped with approved measuring or metering devices which will enable the ENGINEER to record at any time the amount of liquid that has been removed from the container. Application equipment for liquid fertilizer, other than a hydraulic seeder, shall be calibrated to insure that the required rate of fertilizer is applied uniformly.

3.4. Seeding

Seed shall be distributed uniformly over the seedbed at the rate indicated in the seeding schedule, and immediately harrowed, dragged, raked, or otherwise worked so as to cover the seed with a layer of soil. The depth of covering shall be as directed by the ENGINEER. If two kinds of seed are to be used which require different depths of covering, they shall be sown separately.

3.4.1. When a combination seed and fertilizer drill is used, fertilizer may be drilled in with the seed after limestone has been applied and worked into the soil. If two kinds of seed are being used which require different depths of covering, the seed requiring the lighter covering may be sown broadcast or with a special attachment to the drill, or drilled lightly following the initial drilling operation.

3.4.2. When a hydraulic seeder is used for application of seed and fertilizer, the seed shall not remain in water containing fertilizer for more than 30 minutes prior to application unless otherwise permitted by the ENGINEER.

3.4.3. Immediately after seed has been properly covered, the seedbed shall be compacted in the manner and degree approved by the ENGINEER.

3.5. Modifications

When adverse seeding conditions are encountered due to steepness of slope, height of slope, or soil conditions, the ENGINEER may direct or permit that modifications be made in the above requirements which pertain to incorporating limestone into the seedbed; covering limestone, seed, and fertilizer; and compaction of the seedbed.

3.5.1. Such modifications may include but not be limited to the following.

3.5.1.1. The incorporation of limestone into the seedbed may be omitted on (a) cut slopes steeper than 2:1 (b) on 2:1 cut slopes when a seedbed has been prepared during the excavation of the cut and is still in an acceptable condition; or (c) on areas of slopes where the surface of the area is too rocky to permit the incorporation of the limestone.

3.5.1.2. The rates of application of limestone, fertilizer, and seed on slopes 2:1 or steeper or on rocky surfaces may be reduced or eliminated.

3.5.1.3. Compaction after seeding may be reduced or eliminated on slopes 2:1 or steeper, on rocky surfaces, or on other areas where soil conditions would make compaction undesirable.

3.6. Mulch

3.6.1. General

All seeded areas shall be mulched unless otherwise indicated on the plans or directed by the ENGINEER. Application rate of mulch shall be indicated in seeding schedule.

3.6.2. Mulching

Mulch shall be applied within 36 hours after the completion of seeding unless otherwise permitted by the ENGINEER. Care shall be exercised to prevent displacement of soil or seed or other damage to the seeded area during the mulching operations.

3.6.3. Mulch shall be uniformly spread by hand or by approved mechanical spreaders or blowers that will provide an acceptable application. An acceptable application will be that which will allow some sunlight to penetrate and air to circulate but also partially shade the ground, reduce erosion, and conserve soil moisture.

3.6.4. Mulch Binding

Mulch shall be held in place using devices approved by the ENGINEER as per manufacturers recommendations. During application, the CONTRACTOR shall take adequate precautions to prevent damage to structures or appurtenances.

3.7. Maintenance

3.7.1. General

The CONTRACTOR shall be responsible for the proper care and maintenance of the seeded areas until the work under the entire contract has been completed and accepted by the ENGINEER. Maintenance shall consist of repair and replacement of eroded areas, watering, refertilizing, reliming, reseeding, and remulching as necessary to provide an even, fixed growth of grass. In addition, the CONTRACTOR shall provide protection against traffic and shall erect the necessary barricades and warning signs immediately after planting is completed.

3.7.2. Mowing

The seeded areas shall be mowed with approved mowing equipment as per seeding schedule. If weeds or other undesirable vegetation threaten to smother the planted species, such vegetation shall be removed at no cost to the OWNER.

3.8 Inspection and Testing

3.8.1 Fertilizer and Lime

The ENGINEER shall be furnished with duplicate copies of invoices for all fertilizer and lime used on the project. Invoices for fertilizer shall show the grade furnished. Invoices for lime shall show total minimum carbonates and minimum percentages of the material furnished that pass 100-mesh and 20-mesh sieve. Upon completion of the project, a final check of the total quantities of fertilizer and lime used will be made against the total area topsoiled and seeded, and if the minimum rates of application have not been met, the ENGINEER may require the distribution of additional quantities of these materials to make up the minimum application specified at no additional cost to the OWNER.

3.8.2 Seed

The ENGINEER shall be furnished duplicate signed copies of a statement from the Vendor, certifying that each container of seed delivered is fully labeled and in full accordance with the specifications in this section and the seeding schedule.

(End of Section 02933)

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PART ONE – GENERAL:**1.01 – RELATED DOCUMENTS**

Provide all labor, materials, equipment and services indicated on the drawings, or specified herein, or reasonably necessary for, or incidental to a complete job.

PART TWO – PRODUCTS: (This section not applicable.)**PART THREE – EXECUTION:****3.1– Clean Up**

3.1.1 During the progress of the work, keep the site and affected adjacent areas in a neat and clean condition at all times. Remove all rubbish, surplus materials, and unneeded construction equipment from the site. Repair all damages so that the public and property owners will be inconvenienced as little as possible.

3.1.2 Where materials or debris has washed or flowed into, or has been placed in, existing water-courses, ditches, gutters, drains, pipes, and/or structures by work performed under this contract, or elsewhere during the course of the contractor's operations, remove and satisfactorily dispose of such material or debris during the progress of the work. Upon completion of the work, leave all ditches, channels, drains, pipes, and/or structures and work, etc., in a clean and neat condition.

3.1.3 On or before completion of the work, unless otherwise directed or permitted in writing, tear down all temporary buildings and structures built by the contractor for his own use. Remove all temporary works, tools, and machinery or other construction equipment furnished by the contractor. Remove all rubbish from any grounds which have been occupied by the contractor; leave all roads and all parts of the premises and adjacent property affected by the contractor's operations in a neat and satisfactory condition.

3.1.4 Remove, acceptably disinfect and cover all organic matter and materials containing organic matter in, under, and around all privies, houses, and other buildings used.

3.1.5 Restore or replace, when and as directed, any public or private property damaged by contractor's work, equipment or employees to a condition at least equal to that existing immediately prior to the beginning of the operations. Perform, as required, all necessary highway or driveway reshaping of shoulders and ditches, walks and landscaping work. Use suitable materials, equipment and methods for such restoration. The contractor shall be responsible for obtaining releases from the various property owners, stating that all restoration work is satisfactory.

(End of Section 02995)

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PART ONE - GENERAL:**1.1 - Description**

1.1.1 Form cast-in-place concrete indicated on drawings and subsequently remove such forms except earth forms.

1.1.2 Related Work Described Elsewhere

1.1.2.1 Concrete Reinforcement, Section 03200

1.1.2.2 Cast-In-Place Concrete, Section 03300

1.2 – Quality Assurance**1.2.1 Qualifications of Workmen**

Provide superintendent or foreman who will be present during this portion of work, who shall be thoroughly familiar with materials being installed, referenced standards and requirements of this work, and who shall direct work performed under this section.

1.2.2 Codes and Standards

1.2.2.1 In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in publication ACI 347 of the American Concrete Institute, "Recommended Practice for Concrete Formwork".

1.2.2.2 Where provisions of pertinent codes and standards conflict with this specification, the more stringent provisions shall govern.

1.3 - Submittals**1.3.1 Manufacturer's Data**

Submit two (2) copies manufacturer's data and installation instructions for proprietary materials, including form coatings, manufactured form systems, ties and accessories to the owner for approval.

1.4 – Product Handling**1.4.1 Protection**

Use means necessary to protect formwork materials before, during and after installation and to protect installed work and materials of other trades.

1.4.2 Replacements

In the event of damage, immediately make repairs and replacements necessary at no additional cost to the owner.

PART TWO - PRODUCTS:

2.1 - Materials

2.1.2 Forms for Smooth Finished Exposed Concrete

Plywood, metal, metal-framed plywood faced, or other acceptable panel type materials providing continuous, straight surfaces.

2.1.2.1 Plywood shall comply with U.S. Product Standard PS-1, "B-B High Density Overlaid Concrete Form", Class I.

2.1.2.2 Furnish in largest practicable sizes to minimize joints.

2.1.2.3 Furnish in thickness sufficient to withstand pressure of newly placed concrete without bow or deflection.

2.1.3 Forms for Other Unexposed Concrete

Plywood, lumber, metal or other material acceptable to the owner; lumber shall be dressed on at least two (2) edges and one (1) side for tight fit.

2.2 – Accessories

2.2.1 Form Ties

2.2.1.1 Factory fabricated, adjustable length, removable or snap off metal ties, designed to prevent deflection and to prevent spilling upon removal.

2.2.1.2 Do not use form ties fabricated on job site or wire ties.

2.2.2 Form Coatings

Commercially formulated compounds that will not bond with, stain or adversely affect concrete surfaces, and will not impede wetting of surfaces to be cured with water or curing compounds.

2.3 - Formwork Design

2.3.1 Safety

Design, erect, support, brace and maintain formwork to safely support vertical and lateral loads until such loads can be supported by structure.

2.3.1.1 Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position.

2.3.2 Removable

Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete or adjacent materials.

2.3.3 Tighten

Tighten formwork to prevent leakage of wet concrete. Solidly butt joints and provide backup material at joints to prevent leakage and fins.

2.3.4 Side Forms

Side forms of footings may be omitted and concrete placed directly against excavation.

PART THREE - EXECUTION:

3.1 – Surface Conditions

3.1.1 Inspection

3.1.1.1. Before work of this section, inspect installed work of other trades and verify that such work is complete to the point where this installation may properly begin.

3.1.1.2 Verify that forms may be constructed in accordance with pertinent codes and regulations, referenced standards and original design.

3.1.2 Discrepancies

3.1.2.1 In the event of discrepancy, immediately notify the owner.

3.1.2.2 Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.2 - Form Construction

3.2.1 General

3.2.1.1 Construct to dimensions shown, level, plumb and alignment.

3.2.1.2 Fabricate for easy removal without hammering or prying against concrete surfaces.

3.2.1.3 Examine drawings and specifications and consult with other trades relative to provision for openings.

3.2.1.4 Set required time to be embedded in concrete.

3.2.1.5 Keep form sufficiently wetted to prevent joints opening before concrete placement.

3.2.1.6 Brace and tie forms so as to maintain position and shape. Space forms apart and securely tie together, using metal spreader ties that give positive tying and accurate spreading.

3.2.1.7 Exercise care in form layout to avoid necessity for cutting in-place concrete.

3.2.2 Footing Forms

Footing side forms may be of earth, provided soil will stand without caving and sides are made with neat cuts to minimum dimensions shown on drawings. Make necessary provisions to prevent cave-ins during concrete placement.

3.2.3 Forms for Exposed Construction

Provide sharp, clean corners at intersecting planes, without visible edges or offsets.

3.2.4 Form Coatings

Coat form surfaces before reinforcement is placed. Do not allow excess coating material to accumulate in forms or to come into contact with surfaces to be bonded to fresh concrete.

3.3 – Form Removal

3.3.1 General

Do not remove forms until concrete is twenty-four (24) hours old.

3.3.2 Non-Supporting Formwork

3.3.2.1 Formwork not supporting concrete, such as walls and similar parts of the work, may be removed after cumulatively curing at not less than fifty degrees fahrenheit (50 F) for twenty-four (24) hours after concrete placement, provided that:

3.3.2.1.1 Concrete is sufficiently hard to not be damaged by removal.

3.3.2.1.2 Curing and protection operations are maintained.

3.4 – Form Re-Use

3.4.1 Form re-use shall be subject to advance approval by the owner.

3.4.2 Unless specifically approved in advance by the owner, form re-use shall in no way delay or change schedule for concrete placement from schedule obtainable if all forms were new.

(End of Section 03100)

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PART ONE – GENERAL:**1.1 Description****1.1.1 Work Included**

Concrete reinforcement and associated items required for this work as shown on the drawings.

1.1.2 Related Work Described Elsewhere**1.1.2.1. Placement of other embedded items**

Concrete Formwork, Section 03100
Cast-In-Place Concrete, Section 03300

1.2 – Quality Assurance**1.2.1 Qualifications of Workmen**

Provide the superintendent or foreman who will be present during this portion of the work, who shall be thoroughly familiar with materials being installed and the best methods for installation and who shall direct work performed under this section.

1.2.2 Codes and Standards

1.2.2.1 In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in publication ACI 315 of the American Concrete Institute, “Manual of Standard Practice for Detailing Reinforcing Concrete Structures” and ACI 318 (latest edition) “Building Code Requirements for Reinforced Concrete”.

1.2.2.2 Where provisions of pertinent codes and standards conflict with this specification, the more stringent provisions shall govern.

1.3 – Submittals**1.3.1 Shop Drawings**

1.3.1.1 Submit shop drawings to the owner for review.

1.3.1.2 Do not deliver concrete reinforcement to job site until receipt of reviewed shop drawings from the owner.

1.4 – Product Handling

1.4.1 Protection

1.4.1.1 Use means necessary to protect concrete reinforcement before, during, and after installation and to protect installed work and materials of other trades.

1.4.1.2 Store in a manner to prevent excessive rusting and fouling with dirt, grease, and other bond breaking coatings.

1.4.1.3 Use necessary precautions to maintain to maintain identification after bundles are broken.

1.4.2 Replacements

In the event of damage, immediately make repairs and replacements necessary, at no additional cost to the owner.

PART TWO – PRODUCTS:

2.1 – Concrete Reinforcement

Concrete reinforcement materials shall be new, free from loose rust and scale and complying with the following referenced standards:

2.1.1 Reinforcement Bars

ASTM A-615, Grade 60. All reinforcing bars, except No. 2 shall be deformed in accordance with ASTM A-305, latest edition.

2.1.2 Welded Wire Fabric

Welded wire fabric shall conform to ASTM A-185, latest edition.

2.2 – Other Materials

Other materials not specifically described, but required for complete and proper installation of concrete reinforcement, shall be selected by the contractor and subject to approval by the owner.

PART THREE – EXECUTION:

3.1 – Surface Conditions

3.1.1 Inspection

3.1.1.1 Before installation of work of this section, inspect installed work of other trades and verify that such work is complete to the point where this installation may properly begin.

3.1.1.2 Verify that concrete reinforcement may be installed in strict accordance with pertinent codes and regulations, shop drawings and original design.

3.1.2 Discrepancies

3.1.2.1 In the event of discrepancy, immediately notify the owner.

3.1.2.2 Do not start installation until discrepancies and unsatisfactory conditions are corrected.

3.2 – Bending

3.2.1 General

3.2.1.1 Fabricate reinforcement in accordance with shop drawing.

3.2.1.2 Do not use bars with kinks or bends not shown on drawing or shop drawing.

3.2.1.3 Do not bend or straighten steel in a manner that will damage material.

3.2.2 Design

3.2.2.1 Bend all bars cold unless approved by the owner.

3.2.2.2 Make bends for ties around pins having diameter not less than two (2) times minimum bar thickness.

3.2.2.3 Make bends for other bars, including hooks, around pins having diameter not less than six (6) times minimum bar thickness.

3.3 – PLACEMENT

3.3.1 General

Before start of concrete placement, accurately place concrete reinforcement, positively securing and supporting by metal chairs or spacers, or by metal hangers.

3.3.2 Inspection

Prior to placement of concrete, the owner shall be notified in ample time to inspect placement of reinforcement. Inspection of reinforcement will be made only after the placement of each section to be poured. The owner shall always be notified of pouring schedule well in advance.

3.3.3 Clearance

3.3.3.1 Preserve clear space between bars of not less than the normal diameter of round bars.

3.3.3.2 In no case allow clear distance of less than three-quarter inch (3/4") or less than one and one-third (1-1/3) times maximum aggregate size.

3.3.3.3 Minimum clearance for reinforcing shall be two and one-half inches (2-1/2") when in contact with the ground, two inches (2") in concrete walls and three-quarters inch (3/4") in concrete not exposed to weather or in contact with the ground.

3.3.4 Dowels

Place required steel dowels securely anchored into position before concrete is placed.

3.3.5 Obstructions

In the event conduits, piping, inserts, sleeves or other items interfere with placing reinforcement as indicated on drawings or as otherwise required, immediately consult the owner and obtain approval of new procedures before placing concrete.

3.3.6 Splicing

3.3.6.1 Splices shall conform to ACI 238, Chapter 12. Splices shall be Class C unless otherwise indicated.

3.3.6.2 Welded wire fabric shall lap one (1) full mesh and shall be securely wired at each end and side.

3.4 – Cleaning Reinforcement

Concrete reinforcement, at the time concrete is placed, shall be free from rust scale, loose mill scale, oil paint and other coatings which will destroy or reduce bond between steel and concrete.

(End of Section 03200)

PART ONE - GENERAL:**1.1 - Scope****1.1.1 Work Included**

Cast-In-Place concrete required for this work as indicated on drawings and includes, but is not necessarily limited to:

1.1.1.1 Footings and Foundations**1.1.1.2 Portland Cement Concrete Paving****1.1.1.3 Curbs and Gutters****1.1.2 Related Work Described Elsewhere:****1.1.2.1 Concrete Formwork, Section 03100****1.2 – Standards and Specifications****1.2.1 Qualifications**

1.2.1.1 Provide superintendent or foreman who will be present at all times during execution of this portion of work, who shall be thoroughly trained and experienced in placing types of concrete specified and who shall direct work performed under this section.

1.2.1.2 For finishing exposed concrete surfaces, use thoroughly trained and experienced journeymen concrete finishers.

1.2.2 Codes and Standards

1.2.2.1 In addition to complying with pertinent codes and regulations, comply with pertinent recommendations of publication ACI 301 of the American Concrete Institute, "Structural Concrete for Buildings".

1.2.2.2 Where provisions of pertinent codes and standards conflict with this specification, the more stringent provisions shall govern.

1.3 - Submittals**1.3.1 Materials List**

Within ten (10) days after contract award and before any concrete is delivered to job site, submit to the owner a complete list of materials proposed to be provided under this portion of the work, showing manufacturer's name and catalog number of all items such as admixtures, curing compounds and chemical floor hardener, and names and addresses of

transit-mix concrete supplier.

1.3.2 Transit-Mix Delivery Slips

1.3.2.1 Keep record at job site showing time and place of each concrete placement together with transit-mix delivery slip certifying contents of delivery.

1.3.2.2. Make record available to the owner upon request.

1.3.3.3. Upon completion of this portion of work, deliver record and delivery slips to the owner.

1.4 – Product Handling

1.4.1 Protection

Use means necessary to protect cast-in-place concrete materials before, during and after installation and to protect installed work of other trades.

1.4.2 Replacements

In the event of damage, immediately make repairs and replacements necessary at no additional cost to the owner.

PART TWO - PRODUCTS:

2.1 - Concrete

2.1.1 General

2.1.1.1 Concrete shall be transit-mixed in accordance with ASTM C-94, unless otherwise specifically permitted by the owner.

2.1.1.2 Control of concrete production shall be under supervision of an independent laboratory who shall design mixes, train contractor's technician to make concrete cylinder and test concrete cylinders for compression strength. The testing agency shall furnish the owner with certified copies of test results. Cost of all testing shall be borne by the contractor.

2.1.1.2.1 Strength Test: One (1) test consisting of four (4) specimens (cylinders) shall be made for each seventy-five cubic yards (75 c.y.) of each type concrete placed, but not less than one (1) test shall be made for each type concrete for each days work. Procedure for obtaining samples of fresh concrete for preparing test specimens shall be in accordance with ASTM C-172. Specimens for strength tests shall be made and cured in accordance with ASTM C-31. Strength tests of concrete specimens shall be made in accordance with ASTM C-39. One (1) specimen of each set shall be reported by the following day to the owner.

2.1.2 Quality

2.1.2.1 Concrete shall have the following minimum compressive strengths at twenty-eight (28) days and proportioned within the following limits:

<u>Concrete Maximum Location</u>	<u>Compressive Strengths</u>	<u>Maximum Size Aggregate</u>	<u>Minimum Cement/ Cubic Yard</u>	<u>Slump</u>
Footings and Retaining Walls	3,000	1-1/2"	5.25 Sacks	4"
Exterior Slabs, Walks and Curbs & Gutters	3,000	3/4"	5.75 Sacks	4"
All Other Work Not Indicated On Details	5,000	1"	5.25 Sacks	3"

2.1.2.2 Concrete shall have water-cement ratio not exceeding six gallons (6 gal.) per sack.

2.1.2.3 Air-entraining admixture complying with ASTM C-260 shall be added at manufacturer's prescribed rate to result in concrete at point of placement having maximum air content as follows:

2.1.2.3.1 4% for maximum 1-1/2" aggregate.

2.1.2.3.2 6% for maximum 3/4" aggregate.

2.1.3 Portland Cement
ASTM C-150, Type I, unless otherwise indicated.

2.1.4 Aggregates
ASTM C-33, unless otherwise indicated.

2.1.5 Water
Potable

2.1.6 Admixtures

2.1.6.1 Air-entraining admixture - ASTM C-260.

2.1.6.2 Calcium Chloride - Do not use calcium chloride.

2.1.6.3 Other - As specifically authorized in writing by the owner.

2.2 - Accessories

2.2.1 Vapor Barrier Under Slab On-Grade

Minimum eight (8) mil thick polyethylene sheet, decay resistant when tested in accordance with ASTM E-154.

2.2.2 Expansion Joint Material

Self expanding cork, ASTM D-1752, Type III, W.R. Grace/Servicised "4324". W.R. Meadows "Sealtight", or other product specifically approved by the owner.

2.2.3 Curing Compounds

Membrane forming type complying with ASTM C-309, Type I, unless otherwise approved by the owner.

2.2.4 Other Materials

Other materials not specifically described, but required for proper completion of the work of this section, shall be selected by the contractor and subject to the owner's approval.

PART THREE - EXECUTION:

3.1 – Surface Conditions

3.1.1 Inspection

3.1.1.1 Before work of this section, inspect installed work of other trades and verify that such work is complete to the point where this installation may properly begin.

3.1.1.2 Verify the items to be embedded in concrete are in place.

3.1.1.3 Verify that concrete may be placed to lines and elevations indicated on drawings or details, with required clearances for reinforcement.

3.1.2 Discrepancies

In the event of discrepancy, immediately notify the owner. Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.2 - Preparation

3.2.1 General

3.2.1.1 Preparation for placement shall be in accordance with ACI 318 and as specified herein.

Concrete

shall not be placed until reinforcement, anchor bolts, pipes, conduits or other set-in items have been inspected and approved by the owner. Concrete shall not be placed on soft or water-soaked ground, in water, on frozen ground or on surfaces covered with frost. Wood forms shall be thoroughly wetted or oiled before concrete is placed.

- 3.2.1.2 Remove debris from areas in which concrete will be placed.
- 3.2.1.3 Thoroughly clean areas to ensure proper placement and bonding of concrete.
- 3.2.1.4 Thoroughly clean transporting and handling equipment.
- 3.2.1.5 Notify the owner at least forty-eight (48) hours before placing concrete.

3.2.2 Joints

Locate construction joints in slabs where indicated on plans.

3.2.3 Vapor Barrier

Install vapor barrier under slab in continuous sheets, lapping joints six inches (6") minimum.
Cut around penetrations to provide as close fit as possible.

3.3 - Testing

3.3.1 General

3.3.1.1 Test concrete as follows:

- 3.3.1.1.1 Three (3) concrete cylinders for each concrete quality for each days pour.
- 3.3.1.1.2 Make and cure cylinders in accordance with ASTM C-31.
- 3.3.1.1.3 Test for compression in accordance with ASTM C-39 and C-192.
- 3.3.1.1.4 Test for compression in accordance with ASTM C-143 when directed by the owner.

3.3.2 Have available on the job at all times, four (4) six inch by twelve inch (6" x 12") steel cardboard test cylinders and one (1) standard slump cone.

3.3.3 Payment for testing of concrete shall be made by the contractor.

3.4 – Placing Concrete

3.4.1 Method

- 3.4.1.1 Convey concrete from mixer to place of deposit by methods that will prevent separation and loss of material. Method of conveying concrete shall be reviewed with the owner prior to placement of concrete.
- 3.4.1.2 For chuting, pumping and pneumatically conveying concrete, use equipment of size and design as to ensure a practically continuous concrete flow at delivery end without loss or separation of materials.
- 3.4.1.3 Deposit concrete as nearly as possible in its final position to avoid segregation due to handling and flowing.
- 3.4.1.4 Place concrete as dry as possible consistent with good workmanship, never exceeding maximum specified slump.
- 3.4.1.5 Place concrete continuously or in layers on ss that no c be placed on cured concrete which has hardened sufficiently to cause formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joint as herein specified.

3.4.1.6 Concrete shall be placed and protected as specified for temperature conditions:

3.4.1.6.1 Cold weather in accordance with ACI 604.

3.4.1.6.2 Hot weather in accordance with ACI 605.

3.4.2 Rate of Placement

3.4.2.1 Place concrete at such a rate that concrete is at all times plastic and flows readily between bare reinforcing bars. Concrete shall be poured in a continuous operation until placement of section is complete.

3.4.2.2 Do not place a greater area at one (1) time than can be properly finished, particularly during hot or dry weather.

3.4.2.3 Do not in any case place a slab or any other member greater than forty feet (40') in length without expansion joints as shown on the drawings.

3.4.2.4 Place concrete in form in horizontal layers not deeper than twenty-four inches (24") and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

3.4.2.5 Arrangement of construction joint bulkheads shall allow for concrete between construction joints to be placed in a continuous operation, with not more than one (1) hour of elapsed time between pours or not more than two (2) hours when retarders are used. Before placing new concrete on or against hardened concrete, forms shall be re-tightened, hardened surfaces roughened and cleaned of foreign matter and latency and moistened with water. Hardened concrete shall be given a brush coat of neat cement grout, broomed into the surface immediately before placing new concrete.

3.4.3 Consolidation

3.4.3.1 Thoroughly consolidate concrete in accordance with recommended practices of ACI 309 to suit concrete type and project conditions.

3.4.3.2 Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping.

3.4.3.2.1 Do not use vibrators to transport concrete within forms.

3.4.3.2.2 Do not vibrate forms or reinforcing.

3.4.3.3 Place vibrators to rapidly penetrate concrete layer and at least six inches (6") into preceding layer; do not vibrate lower layers that have begun to set.

3.4.3.4 Limit vibration to the time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

3.4.4 Curbs and Gutters

Construct in accordance with locations, line, grade and details shown on the drawings in accordance with the applicable requirements of the South Carolina State Highway Department Standard Specifications for Highway Construction, 2000 Edition, Sections 701, 702 and 721. Match except no extruded curb and gutter will be allowed.

3.5 – Finishing Concrete

3.5.1 Formed Surfaces

3.5.1.1 Provide as-cast rough form finish where concealed in finish work, unless otherwise specified.

3.5.1.2 Smooth-finished exposed concrete shall have forms stripped as soon as possible; after any necessary repairs are made, wet surface thoroughly and rub with No. 16 grit carborundum stone to remove fins and roughness. Spread past resulting from rubbing uniformly over surface and allow to set; moisten and rub with No. 30 stone until smooth and uniform.

3.5.2 Slabs

3.5.2.1 See section 03310

3.6 - Curing

3.6.1 General

3.6.1.1 Protect fresh concrete from premature drying and excessive cold or hot temperatures, mechanical injury or injury from rain or flowing water.

3.6.1.2 Maintain concrete without drying at relatively constant temperature for period of time necessary for cement hydration and proper concrete hardening.

3.6.1.3 Start initial curing as soon as free water has disappeared from surface after finishing. Keep continuously moist for not less than seventy-two (72) hours.

3.6.1.4 Start final curing procedures immediately following initial curing before concrete has dried. Continue final curing for at least seven (7) days in accordance with ACI 301, ACI 604 procedures. Avoid rapid drying at end of final curing period.

3.6.2 Formed Surfaces

Wet forms at least twice daily for at least ten (10) days after concrete placement.

3.6.3 Unformed surfaces

Initially cure unformed surfaces, such as slabs, by moisture curing as specified hereinafter, wherever possible.

3.6.4 Curing Methods

3.6.4.1 Moisture curing shall consist of any of the following methods:

- 3.6.4.1.1 Keeping concrete surface continuously wet by covering with water.
- 3.6.4.1.2 Continuous water-fog spray.
- 3.6.4.1.3 Cover concrete surface with waterproof paper, polyethylene film or white burlap-polyethylene sheet, thoroughly saturating and keeping continuously wet. Place cover over entire surface and around edges with four inch (4") laps over adjacent covers. Immediately repair holes or tears during curing period.
- 3.6.4.1.4 Apply curing compound to horizontal surfaces when concrete is dry to the touch using power spray in two (2) coat continuous operation in accordance with manufacturer's directions.
- 3.6.4.1.5 Maintain concrete temperature between fifty and sixty degrees fahrenheit (50 F to 60 F).
- 3.6.4.1.6 When atmospheric temperature is at eighty degrees fahrenheit (80 F) or above, or during other climatic conditions which would cause rapid drying, make arrangements before concrete placement for installation of wind breaks or shading, and for fog spraying, wet sprinkling or moisture retaining covering, and provide other hot weather protection to complying with ACI 306.
- 3.6.4.1.7 During curing period, maintain concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid concrete temperature changes exceeding five degrees fahrenheit (5 F) in any one (1) hour or twenty degrees fahrenheit (20 F) in a twenty-four (24) hour period.

3.7 – Defective Work

3.7.1 Inspection

Immediately after forms and curing membranes are removed, inspect concrete surfaces and patch voids, rock pockets, form tie holes and other imperfections.

3.7.2 Patching

3.7.2.1 Minor Defective Areas

- 3.7.2.1.1 Chip away to about one inch (1") leaving edges perpendicular to surface; wet area to be patched and at least six inches (6") adjacent to prevent water absorption.
- 3.7.2.1.2 Patching compound shall be L&M Construction Chemicals, Inc. "Everbond", or other product approved by the owner; mixed and applied according to manufacturer. Apply patching mortar immediately.
- 3.7.2.1.3 Patching mortar shall be of as dry consistency as possible within handling and placing requirements; thoroughly compact mortar by ramming into place.
- 3.7.2.1.4 Screed off to leave patch slightly higher than surrounding surfaces; leave

undisturbed for one to two (1-2) hours to permit initial shrinkage, then perform final finishing.

3.7.2.1.5 Finish patch to match adjacent surfaces and keep wet for at least seven (7) days; provide required protective covering.

3.7.2.2 Major Defective Areas

If defects are serious or affect strength of structure or if patching does not satisfactorily restore quality and appearance of surface, the owner may require that concrete be removed and replaced in accordance with provisions of this section at no additional cost to the owner.

(End of Section 03300)

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PART ONE - GENERAL**1.1 Scope**

1.1.1 The work shall include construction of four inch (4") concrete base slabs (foundations) as specified herein and to the dimensions, typical section(s) and notations as shown on the drawings. Construction shall be to the lines and grades as shown on the drawings and/or as directed by the engineer.

1.2 Quality Assurance**1.2.1 Reference Standards**

1.2.1.1 Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards.

1.2.1.1.1 South Carolina State Highway Department Standard Specifications, Latest Edition.

1.2.1.1.2 AASHTO M-213, Joint Material.

1.2.1.1.3 ASTM A-82, Specification for Cold Drawn Steel Wire for Concrete Reinforcement.

1.2.1.1.4 ASTM A-185, Standard Specifications for Welded Steel Wire Fabric Steel Bars for Concrete Reinforcement.

1.3 Workmanship

1.3.1 The contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the engineer.

PART TWO - PRODUCTS**2.1 Forms**

2.1.1 Forms shall be of wood or metal and of a depth equal to or greater than the typical section shown on the drawings. Provide flexible or curved forms where required or directed to prevent a "chord" effect between tangent points when placing forms in areas having specified radii as indicated on the drawings.

2.1.1.a Forms shall be free from warp and of sufficient strength when staked to hold the alignment specified during concrete placing and finishing operations.

2.1.1.b All forms shall be cleaned and oiled prior to placement of concrete.

2.2 Portland Cement Concrete

2.2.1 Concrete shall be 3,000 psi, twenty-eight (28) day, as defined by the South Carolina State Highway Department Standard Specifications, Latest Edition, Section 700, "Portland Cement Concrete for Structures". All concrete shall be ready mixed as produced by a reputable manufacturer, acceptable to the engineer. Submit current approved South Carolina Highway Department mix design to engineer prior to pouring concrete.

2.3 Expansion Joints

2.3.1 Bituminous preformed joint filler complying with requirements of AASHTO M-213 shall be used.

PART THREE - EXECUTION

3.1 General

3.1.1 Construct forms to the exact sizes, shapes, lines and dimensions shown and as required to obtain accurate alignment, location and grades.

3.2 Reinforcement

3.2.1 Place welded steel wire fabric one inch (1") from the bottom of the slab. Fabric to be placed on stools and the fabric pulled up as the concrete is poured.

3.3 Placing Concrete

3.3.1 Concrete shall be placed on a prepared subgrade conforming to Section 02220. Deposit and consolidate concrete in a continuous operation within limits of construction joints until the placing of a panel or section is completed. Bring slab surfaces to the correct level with a straight edge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of lumps or hollows. Do not sprinkle water on the plastic surface. Do not disturb the slab surfaces prior to beginning finishing operations.

3.4 Joints

3.4.1 Expansion joints shall be three-fourths inch (3/4") thick extending for the full depth of the sidewalk section(s). The maximum distance between expansion joints shall be thirty feet (30').

3.4.1.1 Contraction (weakened) joints shall be placed at five foot (5') intervals and shall be formed by cutting the finished sidewalk section(s) with a masonry trowel or by other approved methods.

3.4.1.b The manner of construction of all joints shall be approved by the engineer and shall, after edging, present a smooth acceptable finish.

3.5 Concrete Finishes

3.5.1 Concrete slabs that provide the foundation for brick paving shall be given a wood float finish.

3.6 Protection

3.6.1 Concrete shall be protected and cured in the manner specified for Portland Cement Concrete Pavement, Section 501 of the South Carolina State Highway Department Standard Specifications, Latest Edition.

(End of Section 03310)

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SECTION 33 0500.1 WATER LINES, VALVES, AND APPURTENANCES

PART 1 – DESCRIPTION:

The Contractor shall furnish all labor, materials, equipment and supplies and shall perform all work necessary for the construction of water lines, valves and appurtenances; complete, disinfected, tested and ready for use. The water lines and valves shall be constructed of the size and at the locations shown on the plans.

1.2 **Related Work:** See the following Sections for related specifications:

31 2000.3	Excavating, Backfilling & Compacting for Utilities
32 9200.2	Seeding & Mulching

1.3 **References**

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the following National Specifications or meet the requirements of the latest revision of these specifications:

- ANSI/AWWA C110/A21.03
- ANSI/AWWA C104/A21.4-03
- ANSI/AWWA C111-A21.11-00
- ANSI/AWWA C150/A21.50-02
- ANSI/AWWA C151/A21.51.02
- ANSI/AWWA C153/A21.53-
- ANSI/AWWA C500-02
- ANSI/AWWA C504-00
- ANSI/AWWA C550.05
- ANSI/AWWA C509-01
- ANSI/AWWA C600-05
- ANSI/AWWA C651-
- ANSI/AWWA C900-97
- ANSI/AWWA C906-99
- ASTM A48M-03
- ASTM A53M-06
- ASTM C478-06b
- ASTM D1785-06
- ASTM D2241-05
- ASTM D2487-06
- ASTM D3139-98(2005)
- ASTM F477-02 e1

As a guide, the following definitions apply to the above specifications:

- ANSI – American National Standard Institute
- AWWA – American Water Works Association
- ASTM – Formerly “American Society for and Testing Materials” now “ASTM International”
- NFPA – National Fire Protection Association

PART 2 – MATERIALS:

All materials for water line shall be new and shall be furnished by the Contractor in accordance with the following requirements unless shown otherwise on the plans. All pipe, fittings, packing, jointing materials, valves and fire hydrants shall conform to Section C of the AWWA standards, ANSI/NSF Standard 61, and/or manufacturer's recommended installation procedures. All materials/products must be third party certified as meeting the specifications of ANSI/NSF 61. The certifying party shall be accredited by the ANSI. Natural rubber or other material which will support microbiological growth may not be used for any gaskets, O-rings, and other products used for jointing pipes, setting meters or valves, or other appurtenances which will expose the material to the water. Vegetable shortening shall not be permitted as a lubricant. No lubricants which will support microbiological growth shall be used. All pipe material, solder, flux shall be lead free (less than 0.2% lead in solder and flux and less than 8.0% lead in pipes and fittings).

2.1. Water Lines, 2 Inch Through 16 Inch:

2.1.1. Ductile Iron Pipe, 3 Inch and 4 Inch:

Pipe: AWWA C150 & C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 51 unless shown otherwise on the drawings.

Fittings: AWWA C110, grey or ductile iron; or AWWA C153, ductile iron compact fittings.

Joints: AWWA C111 push-on or mechanical for general buried service; flanged for exposed service unless shown otherwise.

Linings: AWWA C104 cement lining, standard thickness, bituminous exterior seal coat.

2.1.2. Ductile Iron Pipe, 6 Inch Through 16 Inch:

Pipe: AWWA C150 & C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 50 unless shown otherwise on the drawings.

Fittings: AWWA C110, grey or ductile iron; or AWWA C153, ductile iron compact fittings.

Joints: AWWA C111 push-on or mechanical for general buried service; flanged for exposed service unless shown otherwise.

Linings: AWWA C104 cement lining, standard thickness, bituminous exterior seal coat.

2.1.3. PVC Pipe, 2 Inch and 3 Inch:

Pipe: ASTM D-2241 "Polyvinyl Chloride (PVC) Pressure Water Pipe". Pipe provided shall be iron pipe size. Pipe shall be pressure rating 200 (SDR 21) unless otherwise shown on the drawings. All PVC pipe shall bear the National Sanitation Foundation (NSF) potable water logo.

Fittings: Cement lined, gray-iron or ductile iron conforming to AWWA C104 and C110 for fittings size 4-inch through 12-inch. Fittings less than 4-inch shall be PVC, Class 200, IPS with bells conforming to ASTM D3139 and gaskets conforming to ASTM F477.

Joints: Pipe; elastomeric gasket, push-on joints, conforming to ASTM F477 and ASTM 3139. Joints may be either integral bell and spigot or couplings.

2.1.4. PVC Pipe, 4 Inch Through 12 Inch:

- Pipe: AWWA C900 "Polyvinyl Chloride (PVC) Pressure Pipe for Water." Pipe provided shall be cast iron pipe equivalent O.D. Pipe shall be working pressure rated Class 200 (DR21) unless shown otherwise on the drawings. All PVC pressure pipe shall bear the National Sanitation Foundation Seal (NFS). The use of solvent weld PVC pipe in water mains 4" and larger is prohibited.
- Fittings: Cement lined, cast or ductile iron fittings conforming to AWWA C110. The use of solvent weld PVC fittings in water mains 4" and larger is prohibited.
- Joints: Pipe; elastomeric gasket, push-on joints, conforming to AWWA C900 and C111. Joints may be either integral bell and spigot or couplings.

2.2 VALVES:

2.2.1 Gate Valves - 2" through 12": shall be resilient-seated, cast iron body, conforming to AWWA C509, latest revision. Sealing mechanism shall provide zero leakage at the water working pressure against the line flow from either direction and be designed such that no exposed metal seams, edges, screws, etc. are within the waterway in the closed position. The gate shall not be wedged into a pocket nor slide across the seating surface to obtain tight closure. All internal and external ferrous surfaces of the valve, including the interior of the gate, shall be coated with a protective coating conforming to AWWA C550, latest revision. Coating shall be applied to castings prior to assembly to assure all exposed areas will be covered. Valves shall be rated at 200 psi working pressure. Unless otherwise noted, underground valves shall have an operating nut and exposed valves shall have a hand wheel operator. Valves for use in Fire Service applications shall be UL Listed for Fire Service use.

2.2.2 Gate Valves Greater than 12": shall be double-disk, parallel seat, cast iron body, bronze mounted, bottom-wedge type conforming to AWWA C500, latest revision. Valves 16" and larger, for working pressures greater than 50 psi shall be provided with a spur or bevel gear operator and a bypass. Bypass valves shall be the same design as the parent valve. Gear ratios and bypasses shall conform to AWWA C500. Valves shall be rated at 150 psi working pressure.

2.2.3 Tapping Sleeves and Valves shall be the type designed for making connections to existing water lines without loss of water or interruption of service. Sleeves shall be the cast iron split repair type suitable for 200 psi working pressure. Joints shall be suitable for the intended use. Valves shall be the same construction as standard AWWA gate valves, complete with operating nut and suitable for 200 psi working pressure less than 12" and 150 psig for valves 12" and greater.

2.2.4 Butterfly Valves (12" and Larger): All valves on water mains 12-inches in diameter and larger, except tapping valves, shall be direct bury butterfly valves with mechanical joint ends conforming to all requirements of AWWA C504. Unless otherwise shown on the construction plans, all butterfly valves shall be Class 150B.

Each butterfly valve shall be furnished with a manual operator equipped with a 2" square operating nut. The operator shall open the valve when the operating nut is turned to the right or clockwise. The valve and operator shall be assembled for installation in a horizontal line with the main valve shaft horizontal and the operator shaft and operating nut aligned vertically to accept a valve key operated from the surface.

Butterfly valves shall be shop painted for buried service in accordance with AWWA C504. Valves shall be manufactured by Mueller Co., or approved equal.

2.2.5 Indicator posts shall have a cast-iron body, 1-1/4" square operating nut, lockable operating wrench, with "OPEN" and "SHUT" targets appearing in full view when the valve is fully open or closed. Base

shall be flanged and shall bolt onto the indicator post flange provided on top of the valve. The indicator post shall be fully compatible with the approved valve, capable of accepting a tamper switch, and the bury depth shall govern post dimensions. The Indicator posts shall be UL listed in accordance with NFPA 24 and FM approved. Indicator Posts shall be Mueller, No. A-20806, Kennedy Style 2945 or 2945A, or approved equal.

2.2.6 Valve Boxes:

- (a) Each valve buried in the ground shall be provided with an approved type of valve box and cover. The boxes shall be adjustable slip-joint or screw type.
- (b) The valve boxes shall be made of close-grained gray cast iron, in three pieces, comprising the lower or base pieces which shall be belled at the bottom to fit around the stuffing box gland and rest on the valve bonnet, the upper part of which shall be flared on the lower end to telescope on a socket to receive the cap or cover. The cap or cover shall have the word "Water" cast on the upper surface in raised letters. All castings shall be thoroughly cleaned and heavily coated with asphalt or coal-tar varnish.
- (c) The valve boxes shall be made of close-grained gray cast iron, in two pieces, comprising the base piece which shall be flanged on the lower end and grooved at the upper end to receive the cap or cover. The cap or cover shall have the word "Water" cast on the upper surface in raised letters. All castings shall be thoroughly cleaned and heavily coated with asphalt or coal-tar varnish. Valve box shall be Poe 107, AccuCast Item # VBX-126, or Equal.
- (d) Each valve box shall be provided with a concrete valve marker/protector as detailed on the plan.
- (e) Each valve box shall be fitted with an extension stem for use with the buried service non-rising stem valves. The stem shall be of metal and used to extend the position of the 2" operating nut within 6 inches of grade. Each stem shall be fitted with a self-centering disk below the operating nut to keep the stem aligned in the valve box and minimize the amount of grit that can enter the valve box.
- (f) Survey coordinates for each curb box shall be secured flowing final placement with the project surveyor.

2.2.7 Air Valves for water lines shall be APCO Air Release Valve, Crispin Pressure Valve, Golden Anderson or equal. The valve shall be designed for a minimum of 200 psi pressure and sized as shown on the plans.

2.2.8 Air Valve Manholes shall be 4 feet in diameter precast concrete sections conforming to ASTM C-478. Tops shall be eccentric cone where cover permits unless otherwise shown. Frame and cover shall be good quality domestic manufacture conforming to ASTM A48, Class 30 or better. Cover shall be a solid heavy duty casting with the word "Water" cast in the lid.

2.3 **FIRE HYDRANTS:**

2.3.1 Fire Hydrants shall conform to the standard specifications of the American Water Works Association (C502-80) and shall be of the three (3) way type. The hydrant valve opening shall not be less than four and one-half - (4-½) inches. Each hydrant shall be equipped with two (2) two and one-half - (2-½) inch hose connections. The hydrants shall be fitted with bell ends to accommodate the spigot end of six (6) inch ductile iron Pipe and have the standard one and one-half inch pentagon operating nut.

2.3.2 The barrel of the hydrant shall be of proper length to permit a Four (4) foot bury. The valve shall be designed to close against the pressure of the distribution system and remain closed in the event of the upper part of the barrel being broken.

2.3.3 A flange shall be provided, above ground level, to permit adjusting the facing of the hydrant. The hydrant shall be so designed and constructed as to permit replacement of the upper portion of the barrel without digging.

2.3.4 Each nozzle shall have a cast iron cap, suitably attached to the hydrant barrel by means of a chain. Nozzle caps shall be provided with leather gaskets.

2.3.5 Hose nipples shall be of the removable type and shall conform to the existing hose nipples in use by the Owner. On a new system, they shall have National Standard Threads on the hose connection side unless otherwise directed by the Engineer.

2.3.6 Two standard hydrant wrenches shall be furnished.

2.3.7 All fire hydrants furnished for this project shall be of the type known as "breakable" in order that the hydrant barrel may be broken without damaging the lower portion of the hydrant in case of an accident.

2.3.8 All fire hydrants furnished for this project shall meet City of Sumter requirements.

2.4 Steel Encasing Pipe shall be smooth wall, meeting or exceeding ASTM A-139 Grade B 35,000 psi minimum yield strength with minimum wall thickness as defined below:

Steel Encasing Pipe Size O.D.	Wall Thickness (Inches)	For Use with Carrier Pipes of the Following Diameters
12"	0.250	4"
16"	0.250	6"
20"	0.250	8"
24"	0.250	12" (& 10")
30"	0.312	16" & 18"

2.5 Carrier Pipe Supports Within Steel Casing: Shall be steel plate, cold formed structural collar with flanges and a minimum of four support legs welded to the collar. Each support leg shall have a foot or skid welded on the end extending beyond the front and back edge of the collar. The front and rear of each foot shall be angled inwardly towards the collar to serve as a stable, effective skid during installation of the carrier pipe. The carrier support shall be securely fastened to the carrier pipe with a heavy duty ½" grade 5 bolt and locking nut passing between the flanges, compressing the collar against the carrier pipe. The support device shall be a "Spider" or approved equal.

2.6 Bedding Material: shall consist of washed coarse gravel. Gravel material shall be crushed stone or gravel of strong durable nature and shall conform to the standard size No. 57 per "Standard Specifications for Highway Construction, 2000" published by the South Carolina Department of Transportation. A continuous and uniform bedding shall be provided in the trench for all buried pipe. Back-fill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones, other than crushed bedding, shall not come into contact with the pipe and shall not be within six (6) inches of the pipe.

PART 3 - TRENCH EXCAVATION AND BACKFILL:

3.1 Excavation shall conform to the lines and grades shown on the drawings. No trench shall be opened more than four hundred (400) feet in advance of the completed pipe work without the written permission of the Engineer. The lines of excavation of trenches shall be made so there will be a clearance of at least eight (8) inches on each side of the barrel of the pipe. The depth of the trench shall be such that the top of the pipe shall not be less than four (4) feet below finished grade. Excavation shall not be carried below the established grades and any excavation below the required level shall be backfilled and thoroughly tamped as directed by the Engineer, at the Contractor's expense. Bell holes shall be excavated accurately by hand as required by manufacturer's specifications.

3.2 During excavation, the Contractor shall separate materials suitable for backfill from those which are not as defined in Paragraph 3.5 of this section. Suitable material shall be stockpiled near the trench for use as backfill. Unsuitable material shall be removed immediately or shall be stockpiled separately for dewatering or drying or for later removal.

3.3. Should unstable soil, organic soil, or soil types classified as inorganic clays or inorganic silts (Class IV, Unified soil classification CL or lower) be encountered at the bottom of pipe trenches or structure excavations, such soils shall be removed to a depth and width determined by the Engineer and properly disposed of offsite. The resulting undercut shall be backfilled and compacted with sandy soils which meet or exceeds the requirements of Class I or Class II soils, Unified Class SP or better. Placement and compaction shall conform to specifications herein.

3.4 All necessary dewatering pumping, and bailing shall be performed in such a manner as to keep the trench in a satisfactory condition for pipe laying.

3.5 Do not use the following materials for pipe foundation or trench backfill within the zones indicated below:

- All zones: material classified as peat (PT) or organic (OL)(OH) under the Unified Soil Classification (USC) System, ASTM D2487 or material too wet or too dry to achieve minimum compacted density requirements,
- Six inches beneath pipe: soft or unstable material and rock,
- Beside pipe: any material containing more than 75% fines passing #200 sieve.

Where no excavated material is suitable for backfill, furnish suitable material from borrow sites at no additional cost to the Owner.

3.6 Backfilling shall be done with material free from large clods, frozen earth, organic material or any foreign matter.

3.6.1 Around the pipe and to a depth of 12 inches above the pipe the backfill shall be carefully placed and compacted in layers not to exceed 6-inches compacted thickness. The backfill material shall be select and free of rock. Do not place backfill material on either side of the water main that is finer than the material upon it is placed. Backfill with coarser material to the top of the pipe.

3.6.2 Twelve (12) inches above the crown of the pipe the backfill may contain rock but less than 6 inches in diameter. Backfill layers shall be horizontal and not exceed 12 inches loose thickness or 8 inches compacted.

3.6.3 Compaction shall be performed with suitable pneumatic compactors or approved equal. Compaction equipment specifically designed for trench compaction shall be present and operational at the jobsite and shall be utilized throughout the length and depth of the trench to achieve uniform compaction density.

3.6.4 Compaction Density shall be determined by the Standard Proctor Test (ASTM D698) and shall meet the minimum standards in Section 31 2000.3, Excavating, Backfilling & Compacting for Utilities.

3.6.5 Surplus material shall be disposed of by the Contractor at his expense.

3.6.6 Clean shoulders and pavement of excess material immediately after backfilling is complete.

3.6.7 Backfilling fire service piping joints may be performed following successful completion of hydrostatic testing.

PART 4 - LAYING WATER MAINS, HYDRANTS AND SPECIALS:

Proper and suitable tools for the safe and convenient handling and laying of pipe shall be used, and great care shall be taken to prevent the pipe coating from being damaged, particularly on the inside of the pipes.

4.1 All pipe shall be carefully examined for cracks and other defects and no pipe or castings shall be laid which is known to be defective. If any pipe or other casting is discovered to be cracked, broken or defective, after being laid, it shall be removed and replaced by sound pipe, without further charge.

4.2 Before laying the inside of the bell, the outside of the spigot of the pipe shall be thoroughly cleaned.

4.3 Pipe shall be laid to conform accurately to the lines and grades established by the Engineer. All pipes must have a minimum cover of four (4) feet, unless the pipe material is concrete, DIP, or other approved material, and insulated to prevent freezing. The pipe shall be properly bedded as shown on the plans and per manufacturers recommendations.

4.4. Lateral Separation of Sewers and Water Mains: Water mains shall be laid at least 10 feet laterally (horizontally) from the existing or proposed sewers measured from the edge of the pipe to edge of pipe, unless local conditions or barriers prevent a 10-foot lateral separation-in which case:

4.4.1 The water main is laid in a separate trench, with the elevation of the bottom edge of the water main at least 18 inches above the top edge of the sewer; or

4.4.2 The water main is laid in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth, and with the elevation of the bottom of the water main at least 18 inches above the top of the sewer.

4.4.3 When impossible to obtain the distances specified in R.61-58.4.D(12)(a) and (b) SCDHEC may allow an alternative design. Any alternative design shall 1) maximize the distances between the water main and the sewer line and the joints of each. 2) use materials which meet the requirements of R.61-58.4.D(1) for the sewer line; and, 3) allow enough distance to make repairs to one of the lines without damaging the other.

4.5 Crossing a Water Main Over a Sewer: Whenever possible the water main shall be located above the sewer line. Whenever it is necessary for a water main to cross over a sewer, the water main shall be constructed of ferrous materials and be laid at such an elevation that the bottom edge of the water main is at least 18 inches above the top edge of the sewer. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer main and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible.

4.6 Crossing a Water Main Under a Sewer: Whenever possible the water main shall be located below the sewer line. Whenever it is necessary for a water main to cross under a sewer, the water main shall be constructed of ferrous materials and be laid at such an elevation that the bottom edge of the water main is at least 18 inches above the top edge of the sewer. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer main and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer line, adequate support shall be provided for the sewer line to prevent damage to the water main.

4.7 No water pipe shall pass through or come into contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provided that ductile iron pipe is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.

4.8 Concrete Blocking: All bends, tees and plugs, shall be blocked with 3000 psi concrete from the pipe to undisturbed ground to the dimensions shown on the plans. Plant mix concrete is preferred although field mix concrete (Sacrete or equal) may be used as long as it is properly mixed in clean containers with potable water. The concrete shall receive a 24-hour cure before being backfilled. The concrete placed against a plug shall contain a weakness plane (using heavy paper to make this joint), so that when struck with a hammer, it will separate and allow the plug to be removed. If the ground is soft, restrained joint fittings shall be used as directed by the Engineer.

4.9 Valves, Specials and All Other Appurtenances are to be placed as shown on the drawings or at the location and in the manner designated by the Engineer. Any omissions of any of these appurtenances shall be corrected by the Contractor and the same set as originally planned without expense to the Owner. Over each valve a valve box is to be firmly set. Each valve box shall be provided with a standard concrete valve box protector/marker as shown on the plans and fitted with a operating nut extension, as required.

4.10 Hydrants: Shall be set true to grade, with the standpipe plumb. The base of the hydrant shall rest upon a slab of stone or concrete not less than 4 inches thick and 12 inches square.

Beneath and around the base of the hydrant and to a point one foot above drip, at least a quarter of a yard of clean, crushed stone shall be placed, and the trench filled with earth. All other construction requirements shall be according to the detail on the plans.

4.11 Boring and Jacking: Where required, smooth wall steel pipe shall be jacked through dry bores slightly larger than the pipe, bored progressively ahead of the leading edge of the advancing pipe. As the boring and jacking operation progresses, each new section of the encasement pipe shall be butt-welded to the section previously jacked in place.

4.11.1 Unacceptable bores are those with excessive deflection or deflections in the bore resulting in less than four (4) feet of soil cover above the casing, where upon the direction of the Engineer, shall require the bore to be abandoned. The abandonment procedure will be at the Contractor's expense and will consist of cutting off the excess pipe, capping the remaining pipe in place, then filling the abandoned pipe with Portland cement grout (1:3 parts cement to sand) at sufficient pressure to fill all voids before moving to a new location.

4.11.2 The carrier pipe shall be fully supported along its entire length within the casing pipe. Support may be accomplished by securely fastening pressure treated lumber to the carrier pipe or by using "spiders". Either method shall be first submitted to the Engineer for approval, detailing the means of fastening the support devices and spacing of supports.

4.11.3 Length of encasements shall be determined as follows:

Cut sections - Ditch line to ditch line.

Fill sections - 5 feet beyond toe of slope.

Curb sections - 3 feet beyond curb.

Future highway or railroad R/W - Extend full width of R/W or unless otherwise advised.

4.11.4 Materials and workmanship shall also be governed by the requirements set for by the agency issuing the encroachment (Railroad, Department of Transportation, Pipeline Co., etc.). Any specific conditions other than listed herein pertaining to the encroachment are listed in the Special Conditions.

4.12 All mains shall be detectable within three (3) feet with electronic locating equipment. Nonmetallic pipes shall be installed with utility line marking tape which shall be acid and alkali resistant polyethylene film two inches wide and 4 mil thick. The tape shall be manufactured with integral wires for backing or other means to enable detection by a metal detector when the tape is buried up to three feet. The metallic core of the tape shall be encased in a protective jacket or by other means to prevent corrosion. The tape shall bear a continuous printed marking describing the specific utility, i.e. "water".

4.13 Install No. 4/0 copper wire bonding jumper w/Thermite welded junction (or approved alternate) across all joint fittings.

PART 5 – TESTS:

5.1 Pressure/leakage tests must be conducted in accordance with Standard AWWA C600 for installation of ductile iron water mains and appurtenances and Standard AWWA C605 for underground installation of polyvinyl chloride (PVC) pressure pipe and fittings for water. The allowable leakage shall not exceed that determined by the following formula:

PVC

$$L = \frac{ND(P^{1/2})}{7,400}$$

L = Allowable leakage in gallons per hour
 N = Number of joints in pipeline being tested
 D = Nominal diameter of pipe, in inches
 P = Average test pressure, in psig

DIP

$$L = \frac{SD(P^{1/2})}{133,200}$$

L = Allowable leakage in gallons per hour
 S = Length of line tested in feet
 D = Nominal diameter of pipe, in inches
 P = Average test pressure, in psig

5.1.A Pressure test must be conducted in accordance with AWWA Standards C600. The test pressure shall be 1.5 times the maximum working pressure. The test shall be a minimum of two hours.

5.1.B Pressure testing for Fire Service piping shall be performed and documented in accordance with NFPA24.

5.2 Where practicable, pipe lines shall be tested in lengths between line-valves or plugs of no more than 2,000 feet.

5.3 Pipe lines shall be tested before backfilling at joints, except where otherwise required by necessity, local ordinance or public convenience.

5.4 Duration of test shall be not less than 2 hours where joints are exposed, and not less than 24 hours where joints are covered, unless directed by the Engineer. Engineer to witness pressure test.

5.5 All visible leaks at exposed joints, and all leaks evident on the surface where joints are covered, shall be repaired and leakage minimized, regardless of total leakage as shown by test.

5.6 All pipe, fittings, and other material found to be defective under test shall be removed and replaced at the Contractor's expense.

5.7 Lines which fail to meet tests shall be repaired and retested as necessary, until test requirements are complied with.

5.8 Pipe lines with resilient gasket materials should be held under normal operating pressure at least 3 days before testing.

PART 6 - DISINFECTION:

Before being placed in service, all new mains and repaired portions of, or existing mains shall be thoroughly flushed then chlorinated according to AWWA Standard C651 Section 5.2, Continuous-Feed Method. This method shall be followed as outlined below with the exception that the lines shall be disinfected by the addition and thorough distribution of a chlorine solution in concentration sufficient to produce a chlorine residual of at least 50 milligrams per litre (or ppm), in accordance to Section .2203 of the "Rules Governing Public Water Supplies". All samples must be analyzed by a State certified laboratory.

6.1 Preliminary Flushing for fire water and potable water lines. Before being chlorinated, the main shall be filled to eliminate air pockets and shall be flushed to remove particulates. The flushing velocity in the main shall not be less than 2.5 ft/s unless the owner's engineer or job superintendent determines that conditions do not permit the required flow to be discharged to waste. Table 1 shows the rates of flow required to produce a velocity of 2.5 ft/s in pipes of various sizes. Note that flushing is no substitute for preventive measures during construction. Certain contaminants, such as caked deposits, resist flushing at any feasible velocity. No flushing device shall be directly connected to any sewer.

Table 1. Required Flow and Openings to Flush Pipelines (40 psi Residual Pressure in Water Main).

Pipe Diameter (In.)	Flow Required to Produce 2.5 ft/s (approx.) Velocity in Main (gpm)
4	100
6	220
8	400
10	612
12	900
16	1600

6.2.1 Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate into the newly laid water main. In the absence of a meter, the rate may be approximated by methods such as placing a Pitot gauge in the discharge or measuring the time to fill a container of known volume.

6.2.2 At a point not more than 10 ft downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/L chlorine residual. To assure that this concentration is provided, measure the chlorine concentration at regular intervals using appropriate chlorine test kits.

6.2.3 During the application of chlorine, valves shall be positioned so that the strong chlorine solution in the main being treated will not flow into water mains in active service. Chlorine application shall not cease until the entire main is filled with heavily chlorinated water. The chlorinated water shall be retained in the main for at least 24-h, during which time all valves and hydrants in the treated section shall be operated to ensure disinfection of the appurtenances.

6.2.4 Direct-feed chlorinators, which operate solely from gas pressure in the chlorine cylinder, shall not be used for application of liquid chlorine. The preferred equipment for applying liquid chlorine is a solution-feed, vacuum-operated chlorinator and a booster pump. The vacuum-operated chlorinator mixes the chlorine gas in solution water; the booster pump injects the chlorine-gas solution into the main to be disinfected. Hypochlorite solutions may be applied to the water main with a gasoline or electrically powered chemical-feed pump designed for feeding chlorine solutions. Feed lines shall be of such material and strength as to safely withstand the corrosion caused by the concentrated chlorine solutions and the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the solution is applied to the main.

6.2.5 The highly chlorinated water should remain in the line until the chlorine residual drops below 5 ppm or a minimum of 96 hours, whichever is first. After this period, the water will be wasted by pumping into the air to dissipate the remaining chlorine residual. Pumping shall be at a rate not to exceed 25 GPM. Pressure and nozzle size shall be such as to produce an 8 foot (vertical) spray.

The system should then be flushed with potable water and the sampling program started. The number of sampling sites depends on the amount of new construction but must include all dead-end lines and be representative of the water in the newly constructed mains. Sampling shall consist of taking two representative samples every 1200 feet and at each blow-off taken at least 24 hours apart. Also at each site, chlorine residual at time of sampling must be measured and reported. If the membrane filter method of coliform analysis is used, non-coliform growth must also be reported. If the non-coliform growth is greater than 80 colonies per 100 millimeters, the sample result is invalid and must be repeated. The samples shall then be tested by a state approved laboratory for indication of bacteriologically satisfactory water. Three (3) copies of this laboratory test shall be submitted to the Engineer.

END OF SECTION

PART 1 DESCRIPTION:

The CONTRACTOR shall furnish all labor, materials, equipment and supplies and shall perform all Work necessary for the construction of the sewers, complete, tested and ready for use. The sewers shall be constructed to the lines and grades shown and shall be the size shown on the plans.

1.1. RELATED WORK

See the following sections for related specifications.

01016	References to National and State Standard Specifications and Regulations
31 2000.3	Excavation, Backfilling & Compacting for Utilities
31 1000.5	Erosion and Sediment Control
32 9200.2	Seeding and Mulching
32 1313.3	Cast in Place Concrete

1.2. REFERENCES

Any reference to standard National or State Specifications and/or Regulations refers to the most current published date of the specifications unless noted otherwise.

The design, manufacture, and installation of these materials shall meet or exceed the applicable provisions and recommendations of the noted National Specifications and/or Regulations or meet the requirements of the latest revision of these specifications or regulations.

PART 2 MATERIALS

All materials for sewer pipe shall be new and shall be furnished by the CONTRACTOR in accordance with the following requirements unless shown otherwise on the plans.

2.1. GRAVITY SEWERS (8-INCH THROUGH 16-INCH)**2.1.1. Ductile Iron Pipe**

- Pipe: AWWA C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 51 for push-on and MJ pipe and Class 53 for flanged pipe, unless shown otherwise on the drawings
- Fittings: AWWA C110, grey or ductile iron, or compact ductile iron conforming to AWWA C153
- Joints: AWWA C111 push-on unless shown otherwise
- Linings: AWWA C104 cement lining, standard thickness, with bituminous seal coat

2.1.2. PVC Sewer Pipe

- Pipe: ASTM D3034; "Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings." SDR 35 with a minimum cell classification of 12454-B
- Fittings: ASTM D3034. Fittings in sizes through 8" shall be molded in one piece with elastomeric joints and minimum socket depths as specified in Sections 6.2 and 7.3.2. Fittings 10" and larger shall be molded or fabricated in accordance with Section 7.11 with manufacturer's standard pipe bells and gaskets
- Joints: ASTM D-3212, Elastomeric gaskets conforming to ASTM F477

2.1.3. PVC Force Main Sewer Pipe

- Pipe: ASTM 2241; "Polyvinyl Chloride (PVC) Force Main Sewer Pipe and Fittings Based on Controlled Inside Diameter". PVC plastic with a minimum cell classification of 12454-C as defined in ASTM D-1784
- Fittings: ASTM D-3034 lateral hubs
- Joints: ASTM D-3212, elastomeric seal gaskets conforming to ASTM F-477

2.2. FORCE MAINS

2.2.1. Ductile Iron Pipe (3-Inch Through 12-Inch)

- Pipe: AWWA C151 "Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water and Other Liquids." Thickness Class 51 for push-on and MJ pipe and Class 53 for flanged pipe, unless shown otherwise on the drawings
- Fittings: AWWA C110, grey or ductile iron
- Joints: AWWA C111 push-on or mechanical for general buried service; flanged for exposed service unless shown otherwise on the drawings

2.2.2. PVC Pipe (4-Inch Through 12-Inch)

- Pipe: AWWA C900 "Polyvinyl Chloride (PVC) pressure pipe. Pipe provided shall be cast iron pipe equivalent O.D. Pipe shall be pressure Class 150 (DR=18) unless shown otherwise on the drawings
- Fittings: Cement lined, cast or ductile iron fittings conforming to AWWA C110, or compact ductile iron conforming to AWWA C153
- Joints: Pipe, elastomeric gasket, push-on joints, conforming to AWWA C900. Joints may be either integral bell and spigot or couplings. Fittings; AWWA C111, push-on

2.2.3. PVC Pipe (1-Inch Through 4-Inch)

- Pipe: ASTM D-2241 "Polyvinyl Chloride (PVC) pressure water pipe. Pipe provided shall be iron pipe size. Pipe shall be pressure Class 200 (SDR 21) unless shown otherwise on the drawings.
- Fittings: Cement lined, gray-iron or ductile iron conforming to AWWA C104 and C110 for fittings size 4-inch through 12-inch or compact fittings conforming to AWWA C153. Fittings less than 4-inch shall be PVC, Class 200, IPS with bells conforming to ASTM F477.
- Joints: Pipe or compact ductile iron fittings conforming to AWWA C153, elastomeric gasket, push-on joints, conforming to ASTM F477 and ASTM 3139. Joints may be either integral bell and spigot or couplings.

2.3. SEWAGE AIR AND VACUUM TESTS

Sewage Air and Vacuum Valves in sewer force mains shall be the type specifically designed for use with sewage. Valves shall be designed to vent large quantities of air when the line is being filled and to allow air to re-enter the line when it is being drained. Overall height of valve body without accessories shall be not less than fifteen (15") inches. Materials shall include cast iron body and cover, bronze float stem and guide, rubber seat and stainless steel float. Valves shall be furnished with provisions for backflushing. Valves shall be designed for working pressure of 150 psi.

2.4. SEWAGE AIR RELEASE VALVES

Sewage Air Release Valves in sewer force mains shall be the type designed for use with sewage. Valves shall be designed to operate (open) while pressurized allowing entrained air in a sewage force main to escape through the air release orifice and prevent media from escaping. Materials shall include cast iron

body and cover, rubber seat, stainless steel float stem and internal linkages. The valves shall be sized according to the detail drawings and designed for minimum working pressures of 150 psi.

2.5. STEEL ENCASING PIPE

Steel Encasing Pipe shall be smooth wall meeting or exceeding ASTM A-139, Grade B 35,000 psi minimum yield strength with a minimum wall thickness as defined below:

CARRIER PIPE	Casing Pipe	Thickness		Recommended* Min. Tunnel
		D.O.T.	R.R.	
6-Inch Ductile Iron	14"	.250"	.281"	48"
8-Inch Ductile Iron	18"	.250"	.281"	48"
10-Inch Ductile Iron	20"	.250"	.344"	48"
12-Inch Ductile Iron	22"	.250"	.375"	48"
16-Inch Ductile Iron	28"	.312"	.469"	48"
18-Inch Ductile Iron	30"	.312"	.469"	48"
20-Inch Ductile Iron	32"	.375"	.501"	48"
24-Inch Ductile Iron	36"	.375"	.532"	48"

2.5. CARRIER PIPE SUPPORTS

Carrier Pipe Supports within Steel Casing shall be steel plate, cold formed structural collar with flanges and a minimum of four support legs welded to the collar. Each support leg shall have a foot or skid welded on the end extending beyond the front and back edge of the collar. The front and rear of each foot shall be angled inwardly towards the collar to serve as a stable, effective skid during installation of the carrier pipe. The carrier support shall be securely fastened to the carrier pipe with a heavy duty one-half (1/2") inch grade five (5) bolt and locking nut passing between the flanges, compressing the collar against the carrier pipe. The support device shall be a Spider or approved equal.

2.6. UTILITY LINE MARKING TAPE

Utility Line Marking Tape shall be acid and alkali resistant polyethylene film two (2") inches wide and four (4) mil thick. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to three feet. The metallic core of the tape shall be encased in a protective jacket or by other means to prevent corrosion. The tape shall bear a continuous printed marking describing the specific utility, i.e. "SEWER."

PART 3 INSTALLATION:

3.1. TRENCH EXCAVATION AND BACKFILL

3.1.1. Excavation shall conform to the lines and grades shown on the drawings. No trench shall be opened more than two hundred (200') feet in advance of the completed pipe Work without the written permission of the ENGINEER. The lines of excavation of trenches shall be made so there will be a clearance of at least eight (8") inches on each side of the barrel of the pipe. Excavation shall not be carried below the established grades and any excavation below the required level shall be backfilled and thoroughly tamped as directed by the ENGINEER, at the CONTRACTOR's expense. Bell holes shall be excavated accurately by hand.

3.1.2. During excavation, CONTRACTOR shall separate materials suitable for backfill from those defined unsuitable. Do not use the following materials for pipe foundation or trench backfill within the zones indicated below:

- All zones: material classified as peat (PT), organic soil (OL)(OH) under the Unified Soil Classification (USC) System, ASTM D-2487 and all materials too wet or too dry to achieve minimum compacted density requirements
- Six inches beneath pipe: soft or unstable material and rock
- Beside pipe: any material containing more than 75% fines passing #200 sieve

Suitable material shall be stockpiled near the trench for use as backfill. Unsuitable material shall be removed immediately or shall be stockpiled separately for dewatering or drying and later removal. Where no excavated material is suitable for backfill, furnish suitable material from borrow sites at no additional cost to the OWNER.

3.1.3. All unstable soil, organic soil, or soil types classified as inorganic clays and inorganic elastic silts (Class IV, Unified Class CL or lower) that are encountered at the bottom of pipe trenches or structure excavations shall be removed to a depth and width determined by the ENGINEER and properly disposed of. The resulting undercut shall be backfilled and compacted with sandy soils which meets or exceeds the requirements of Class I or Class II soil, Unified Class SP or better. Placement and compaction shall conform to the compaction specifications herein and on the plans.

3.1.4. All necessary dewatering pumping and bailing shall be performed in such a manner as to keep the trench in a satisfactory condition for pipe laying.

3.1.5. Backfilling shall be done with material free from large clods, frozen earth, organic material and any foreign matter.

3.1.5.1. Around the pipe and to a depth of twelve (12") inches above the pipe the backfill shall be carefully placed and compacted in layers not to exceed six (6") inches compacted thickness. The backfill shall be select and free of rock. Do not place backfill material on either side of the gravity sewer that is finer than the material upon which it is placed. Backfill with coarser material to the top of the pipe.

3.1.5.2. Twelve (12") inches above the crown of the pipe the backfill may contain rock but less than six (6") inches in diameter. Backfill layers shall be horizontal and not exceed twelve (12") inches loose or eight (8") inches compacted.

3.1.5.3. Compaction shall be performed with suitable pneumatic compactors or approved equal equipment. Compaction equipment specifically designed for trench compaction shall be present, operational and at the jobsite at all times. Compaction equipment shall be utilized throughout the length and depth of the trench to achieve uniform compaction density.

3.1.5.4. Compaction density shall be determined by the Standard Proctor Test (ASTM D-698) and shall meet the minimum standards in Section 31 2000.3, Excavating, Backfilling & Compacting for Utilities.

3.1.5.5. Surplus material shall be disposed of by the CONTRACTOR at his expense.

3.1.5.6. Clean shoulders and pavement of excess material immediately after backfilling is complete.

3.2. LAYING SEWERS

3.2.1. Gravity Sewers

All sewers shall be laid and jointed in accordance with approved manufacturer's recommendations and shall be laid true to line and grade proceeding upgrade with the spigot pointing in the direction of flow. The sections of pipe shall be laid and fitted together so that, when complete, the sewer will have smooth and uniform invert, with full-length of the barrel resting on the trench bottom or bedding prepared for the pipe. Holes shall be excavated to accommodate pipe bells. The pipe shall be kept thoroughly clean. Each pipe shall be inspected for defects before lowering pipe into trench. Water shall not be allowed to rise around joints until they have been made tight. All sewers shall be constructed with a minimum of three (3) feet of cover, unless justified by the Engineer and approved by the SC DHEC. (e.g. ductile iron pipe may have less than three (3) feet [Reg R.61-67.300.A.12].)

3.2.1.1. All gravity sewer shall be bedded in accordance with Section D, Pipe Bedding and Backfilling Chapter 9 Section D Page 183 in WPCF (WEF) manual of Practice NO. FD-5 (ASCE Manual No. 60), ASTM D2321 for Flexible Pipe (PVC) and Section F2.9 page 202 in WPCF (WEF) Manual No. FD-5 for Rigid Pipe (Ductile Iron) Chapter 9, Section F2.9 for the proposed depth of sewer, and as detailed in the contract drawings.

3.2.1.2. The exposed end of all pipes shall be closed by means of an approved plug to prevent earth or other substances from entering the pipe. The interior of the sewer shall be kept free from all dirt, cement or superfluous materials of every description as the work progresses.

3.3.3. BORING AND JACKING

Where required and shown on the construction drawings, smooth wall or spiral weld steel pipe shall be jacked through dry bores slightly larger than the pipe, bored progressively ahead of the leading edge of the advancing pipe. As the boring and jacking operation progresses, each new section of the encasement pipe shall be butt-welded to the section previously jacked in place.

3.3.3.1. Obstructions encountered during the boring and jacking operation or deflections in the bore resulting in less than thirty (30") inches of soil cover above the casing, shall require the bore to be abandoned. The abandonment procedure consists of cutting off the excess pipe, capped then filled with Portland cement grout (1:3 parts cement to sand) at sufficient pressure to fill all voids before moving to a new location.

3.3.3.2. The carrier pipe shall be fully supported along its entire length within the casing pipe. Support may be accomplished by securely fastening pressure treated lumber to the carrier pipe or by using "spiders." Either method shall be first submitted to the ENGINEER for approval, detailing the means of fastening the support devices and spacing of supports.

3.3.3.3. Length of encasements shall be determined as follows.

- Cut sections - Ditch line to ditch line
- Fill sections - 5 feet beyond toe of slope
- Curb sections - 3 feet beyond curb
- Future highway or railroad R/W - Extend full width of R/W or unless otherwise noted.

3.3.3.4. Materials and workmanship shall also be governed by the requirements set for by the agency issuing the encroachment (Railroad, Department of Transportation, Pipeline Co., Etc.). Any specific conditions other than listed herein pertaining to the encroachment are listed in the Special Conditions.

3.4 SEPARATION OF SEWERS AND WATER MAINS (R-61.67.300.A.14.(AA0 –(F))

3.4.1 Portable Water Supply Interconnections. There shall be no physical connection between a public or private potable water supply system and a sewer or appurtenances thereto which may permit the passage of any sewerage or polluted water into the potable supply. No potable water pipe shall pass through or come in contact with ant part of a sewer manhole.

3.4.2 HORIZONTAL AND VERTICAL SEPARATION FROM POTABLE WATER MAINS: Sewers shall be laid at least 10 feet horizontally from any existing or proposed potable water main. The distance shall be measured from pipe edge to edge. In cases where it s not practical to maintain a ten (10) foot separation, SC DHEC may allow deviation on a case by case basis, if supported by the design engineer. Such deviation may allow installation of the sewer closer to a potable water main, provided that the water main is in a separate trench or on an undisturbed earth self located on one side of the sewer and at an elevation so that the bottom of the water mains is at least eighteen (18) inches above the top of the sewer.

3.4.3 CROSSING: Sewers crossing potable water mains shall be laid to provide a minimum vertical separation of eighteen (18) inches between the outside of the water main and the outside edge of the sewer. This shall be the case where the potable water main is either above or below the sewer main. Whenever possible, the potable water main shall be located above the sewer main. When a new sewer crosses a new potable water main, a full length of pipe shall be used for both the sewer line and the potable water main, and the crossing shall be arranged so that the joints of each line be as far as possible from the point of crossing and each other. When a potable water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the potable water main while maintaining line and grade.

3.4.4 Force mains: There shall be at least a ten (10) foot horizontal separation between the sanitary force mains and potable water mains. There shall be an eighteen (18) inch vertical separation at crossings as required in DHEC Regulation R.61- sub section 67.300.A.14.b and subsection 67.3000.A.14.c.

3.4.5 Special conditions: When it is impossible to obtain the distance specified Subsection 67.300.A.14.b, subsection 67.300.A.14.d, SC DHEC may allow an alternative design. An alternative design shall:

- 3.4.5.1 Maximize the distance between the sewer line and the potable water main and the joints of each.
- 3.4.5.2 Use pipe materials which meet the requirements as specified in SCDHEC Regulation 61-58.4 (DX)(10 for the sewer line
- 3.3.5.3 Allow enough distance to make repairs to one of the lines without damaging the other.

3.5 INSTALLATION OF JOINTS

3.5.1. MECHANICAL JOINTS

The socket, gasket or spigot of the pipe shall be cleaned of all foreign matter. The gland shall be slipped on the spigot end, followed by the gasket and the pipe end pushed into the bell. The ring gasket shall be properly seated so that it is totally confined under pressure within the bell. The loose gland shall be moved into position against the face of the gasket and the nuts and bolts loosely assembled with the fingers and then made up tight with a suitable ratchet wrench.

3.5.2 PUSH-ON JOINTS

The joint shall be thoroughly cleaned, prepared, lubricated and installed in accordance with the requirements, instructions and recommendations of the manufacturer and ENGINEER.

3.5.3 SOLVENT CEMENTS JOINTS

The joint shall be thoroughly cleaned, prepared and installed in accordance with the requirements, instructions and recommendations of the manufacturer and ENGINEER.

3.5.4 GROOVED JOINTS

Joints shall be installed in accordance with manufacturers' published installation instructions.

3.6 TESTING

All pipe installations shall be tested as specified herein. The Testing shall meet all of the requirements of AWWA C-600 (DIP) or AWWA C-605 (PVC) and SC DHEC Regulation subsection 67..300.D.5. Tests shall be performed by CONTRACTOR at his expense in the presence of ENGINEER or his representative. Testing shall not be performed until such time that all Work which may affect the results of the testing has been completed. Where a test section fails to meet test requirements, CONTRACTOR shall make corrections as specified herein and retest the section. The correct/retest procedure shall continue until such time as test requirements are met. All gravity lines will be lamped by the ENGINEER. The CONTRACTOR shall furnish two (2) personnel to assist the ENGINEER in removing and replacing manhole covers, and in carrying ENGINEER's tripod, hoist and other equipment necessary to perform this task.

3.6.1. AIR TEST: All gravity sewer pipe

3.6.1.1. Procedure

3.6.1.1.1. Air test shall be conducted in strict accordance with the testing equipment manufacturer's instructions, including all recommended safety precautions. No one will be allowed in the manholes during testing. Equipment used for air testing shall be equipment specifically designed for this type of test, and is subject to approval of the ENGINEER.

3.6.1.1.2. The test shall be performed only on clean sewer mains after services are installed and the pipe is completely backfilled. Clean sewer mains by propelling snug fitting inflated rubber ball through the pipe with water. After completely cleaned, plug all pipe outlets with suitable test plugs. Brace each plug securely.

3.6.1.1.3. For pipe within test sections above the ground water table, add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to the starting pressure of 4 psig. After the starting pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure. When pressure decreases to 3.5 psig, start stopwatch. Determine the time that is required for the internal air pressure to reach 2.5 psig.

3.6.1.1.4. For pipe with test sections below the ground water table, determine the starting pressure for the test section, in psig, as follows.

- Determine the maximum depth of pipe within the test section in feet.
- Multiply this depth by 0.67 and add 9.3 feet.
- Multiply the result in part 2 by 0.43 and round to the nearest 0.5 psig. After this starting pressure is obtained, continue the test in accordance with the procedure in the paragraph above.

3.6.1.2. REQUIREMENT

The test section shall be acceptable if the elapsed time for pressure drop of 1.0 psig is greater than the sum of the times shown below for all pipe sizes within the test section.

LENGTH	PIPE DIAMETER (INCHES)								
	4	6	8	10	12	15	18	21	24
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55
1000:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34	
1250:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20	
1500:26	0:59	1:46	2:45	3:58	6:11	8:30	"	"	
1750:31	1:09	2:03	3:13	4:37	7:05	"	"	"	
2000:35	1:19	2:21	3:40	5:17	"	"	"	12:06	
2250:40	1:29	2:38	4:08	5:40	"	"	10:25	13:36	
2500:44	1:39	2:56	4:35	"	"	8:31	11:35	15:07	
2750:48	1:49	3:14	4:43	"	"	9:21	12:44	16:38	
3000:53	1:59	3:31	"	"	"	10:12	13:53	18:09	
3501:02	2:19	3:47	"	"	8:16	11:54	16:12	21:10	
4001:10	2:38	"	"	6:03	9:27	13:36	18:31	24:12	
4501:19	2:50	"	"	6:48	10:38	15:19	20:50	27:13	
5001:28	"	"	5:14	7:34	11:49	17:01	23:09	30:14	

3.6.1.3. Corrective Measures

If elapsed time is less than the specified amount, CONTRACTOR shall locate and repair leaks and repeat the test until elapsed time exceeds the specified amount.

3.6.2. INFILTRATION/EXFILTRATION TEST (USE ALL MANHOLES)

3.6.2.1. The use of this method for sewer pipe, in lieu of air tests may be used as an alternate test method.

3.6.2.2. Procedure

3.6.2.2.1. Infiltration: Immediately following a period of heavy rain, a test of Work constructed up until that time shall be made. Three (3) measurements shall be made at one (1) hour intervals to compute the amount of the infiltration. Tests for manholes only shall be conducted on individual manholes. Tests for

pipe and manholes shall be performed on test sections not exceeding 3,500 linear feet of collector sewer and shall include both pipe and manholes. The ENGINEER reserves the right to use his judgement as to whether the ground is sufficiently saturated and/or whether the fall of rain is adequate to permit making infiltration tests. In the event that sufficient rain does not occur before the date of completion, the CONTRACTOR shall be required to conduct the tests at any time during a thirty (30) day period following this date. Should the ENGINEER determine that certain pipe or manholes cannot be tested by infiltration methods, the ENGINEER may direct the filling of lines and the measurement of exfiltration. The allowable rate of exfiltration shall be the same as for infiltration.

3.6.2.2.2. Exfiltration: Determine test sections as outlined for infiltration tests. Install a temporary water plug at the inlet and outlet of the test section. Fill test section with clean water up to the bottom of the lowest manhole frame within the test section. Allow time for saturation of pipe and manholes refilling test section as required. Beginning with a full test section, allow at least eight (8) hours to elapse without adding water. Measure the water level at the beginning and end of the elapsed time above. Compute the volume of water lost in gallons per hour.

3.6.2.3. Test Requirements

- The rate of water loss/gain shall be less than the rate, in gallons per hour, calculated for the test section using the following allowances:
- Sewer main and manholes with or without service laterals; 100 gallons per 24 hours per inch of sewer main diameter per mile of sewer main (gpd/in-mi)
- Manholes only; 1 gallon per 24 hours per vertical foot of manhole

3.6.2.4. Corrective Measures

If actual leakage rate is greater than required leakage rate, CONTRACTOR shall locate and repair leaks and repeat the test until actual leakage is less than the required rate.

3.6.3. DEFLECTION TEST

3.6.3.1. Use all gravity sewer, eight (8”) inch diameter through fifteen (15”) inch diameter except ductile iron.

3.6.3.2. Procedure

Tests shall be performed by the CONTRACTOR in the presence of the ENGINEER no sooner than thirty (30) days after completion of backfill. The OWNER, at his option, may require a second test within the guarantee period of the project. A nine (9) arm mandrel and proving ring, as manufactured by Wortco, Inc. or an approved equal, will be provided by the CONTRACTOR. The mandrel shall be manually pulled, from manhole, through the entire length of mainline pipe. The mandrel and proving ring shall remain the property of the CONTRACTOR.

3.6.3.3. Requirement

All pipes shall allow passage of the test mandrel. The mandrel and proving ring shall be sized at five (5%) percent less than the ASTM dimension for the pipe in accordance with the following table.

NOM. DIA	L	ASTM D3034 SDR 35 D	ASTM D2680 D
8"	8"	7.28"	7.40"
10"	10"	9.09"	9.31"

12"	12"	10.79"	11.22"
15"	15"	13.20"	14.09"

L = Mandrel Contact Length
D = I.D. of Proving Ring

3.6.3.4. Corrective Measures

All pipe that fails the deflection test shall be removed, replaced and retested at no additional expense to the OWNER.

3.6.3.5. All pipe, fittings, and other material found to be defective under test shall be removed and replaced at the CONTRACTOR's expense.

3.6.3.6. Lines which fail to meet tests shall be repaired and retested as necessary, until test requirements are complied with.

3.6.4. FORCE MAIN PRESSURE TEST

3.6.4.1 The pressure/leakage test of water mains shall be in accordance with Standard AWWA C600, latest revision. The allowable leakage shall not exceed that determined by the following formula:

$$L = \frac{SD \sqrt{P}}{133,200}$$

L = Allowable leakage in gallons per hour

S = Length of line tested in feet

D = Nominal diameter of pipe, in inches

P = Average test pressure, in psi - 1.50 average system pressure in the area, but not less than 100 psi.

3.6.4.2. Where practicable, pipe lines shall be tested in lengths of no more than two thousand (2000') feet.

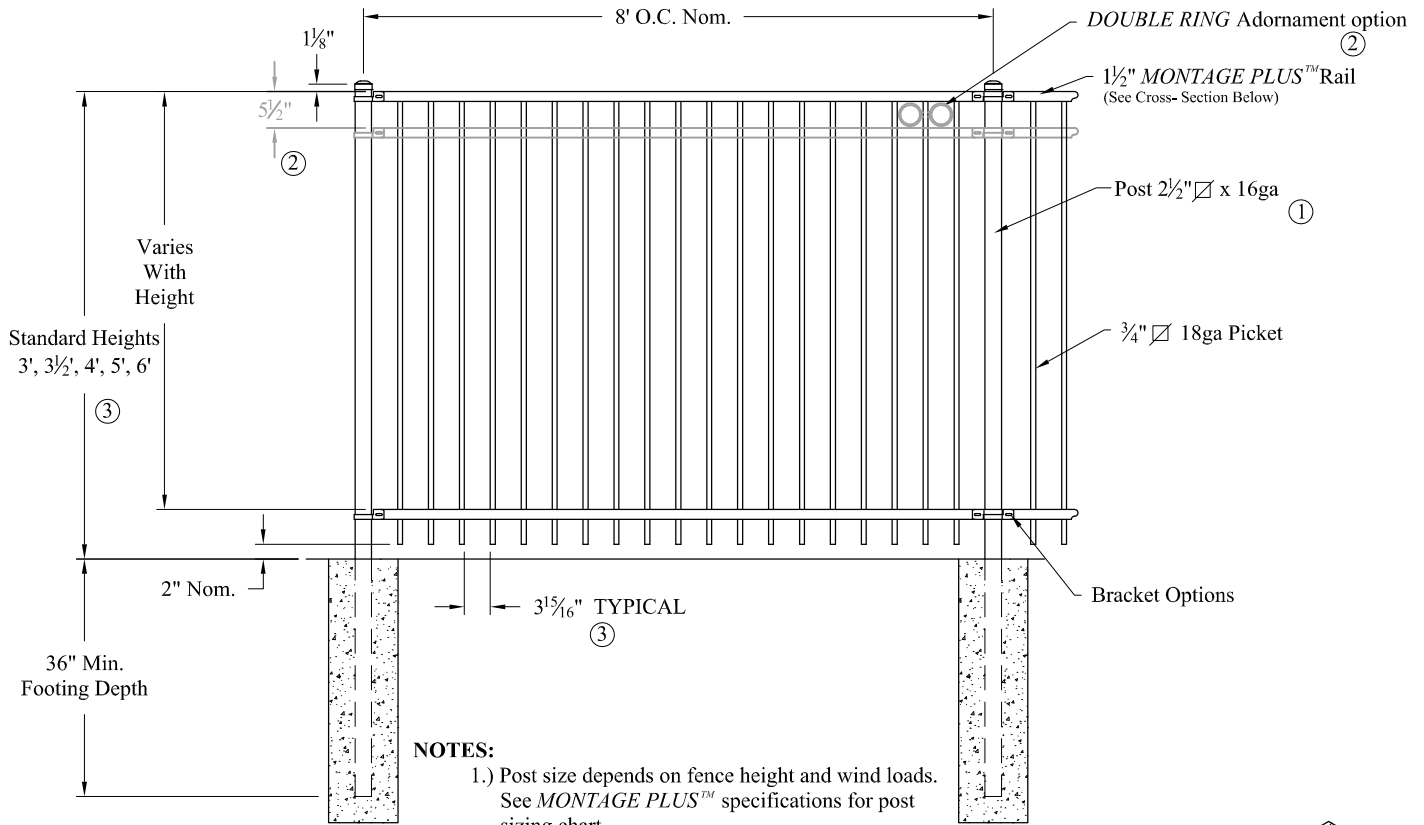
3.6.4.3. Duration of test shall be not less than two (2) hours where joints are exposed, and not less than twenty-four (24) hours where joints are covered, unless directed by the ENGINEER. Engineer to witness pressure test.

3.6.4.4. All visible leaks at exposed joints, and all leaks evident on the surface where joints are covered, shall be repaired and leakage minimized, regardless of total leakage as shown by test.

3.6.4.5. All pipe, fittings, and other material found to be defective under test shall be removed and replaced at the CONTRACTOR's expense.

3.6.4.6. Lines which fail to meet tests shall be repaired and retested as necessary, until test requirements are complied with.

END OF SECTION

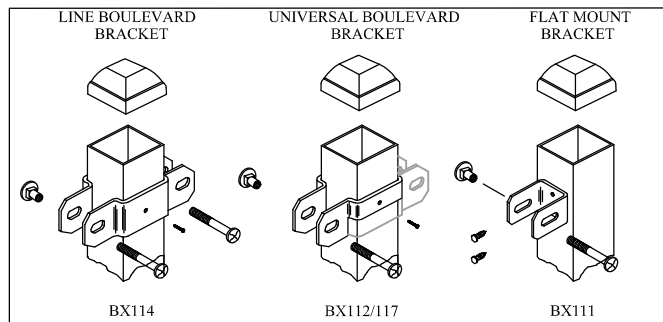
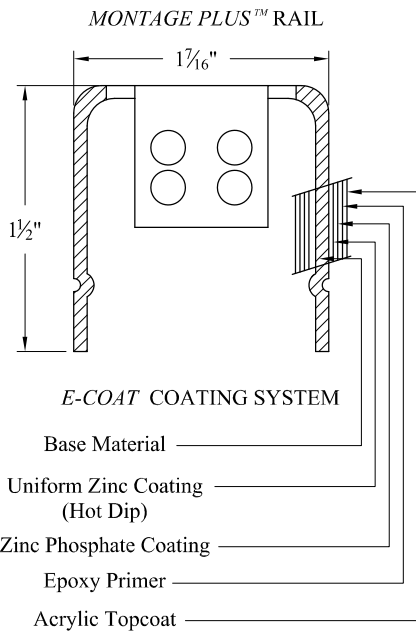
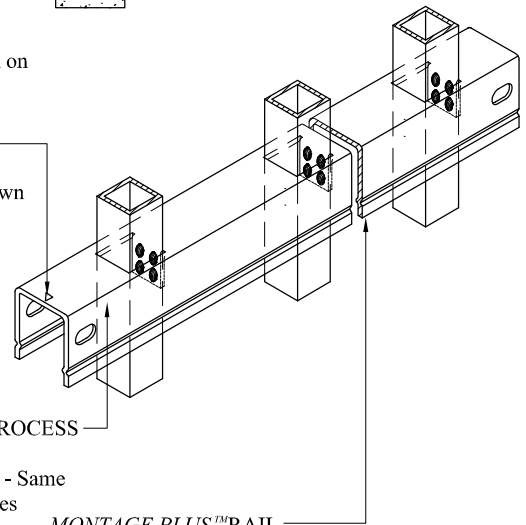


NOTES:

- 1.) Post size depends on fence height and wind loads. See MONTAGE PLUS™ specifications for post sizing chart.
- 2.) Third rail required for Double Rings.
- 3.) Available in 3" air space and/or Flush Bottom on most heights.

RAKING DIRECTIONAL ARROW

Welded panel can be raked 30" over 8' with arrow pointing down grade.



**COMMERCIAL STRENGTH WELDED STEEL PANEL
PRE-ASSEMBLED**

Values shown are nominal and not to be used for installation purposes. See product specification for installation requirements.

IRMISO

Title: **MONTAGE PLUS MAJESTIC 2/3-RAIL**

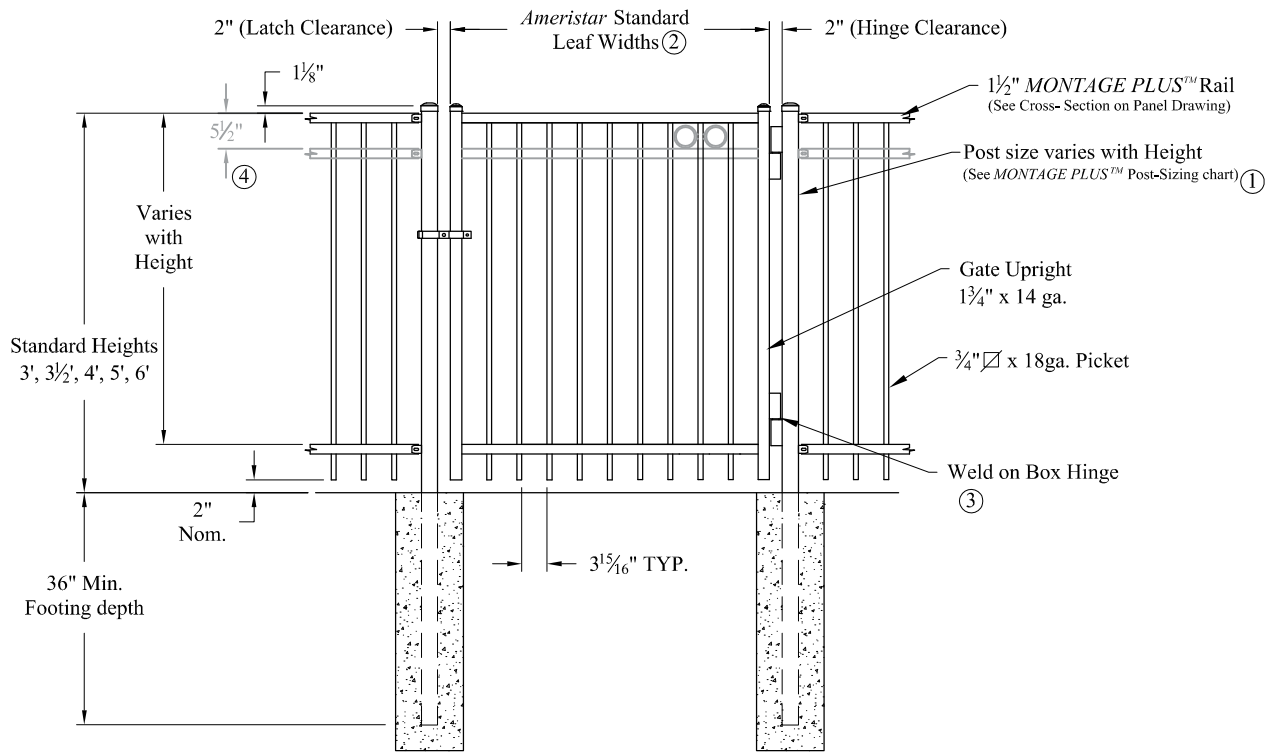
DR: CI	SH . 1 of 1	SCALE: DO NOT SCALE
CK: ME	Date 6/28/10	REV: e



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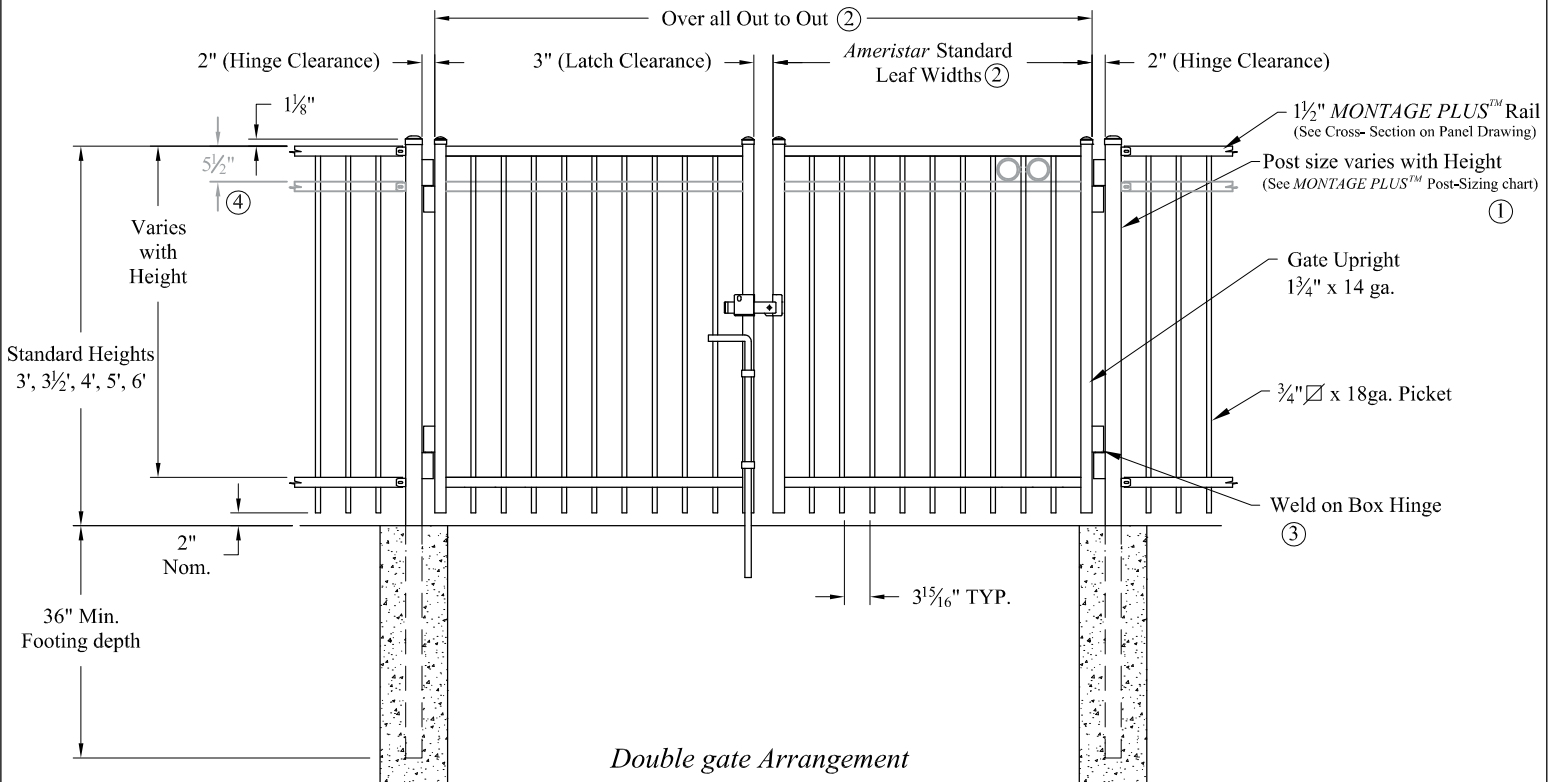
1555 N. Mingo
Tulsa, OK 74116
1-888-333-3422
www.ameristarfence.com

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NOTES: *Single gate Arrangement*

- 1.) Post size depends on fence height, weight and wind loads. See *MONTAGE PLUS™* specifications for post sizing chart.
- 2.) See *Ameristar* gate table for standard out to outs. Custom gate openings available for special out to out/leaf widths.
- 3.) Additional styles of gate hardware are available on request. This could change the Latch & Hinge Clearance.
- 4.) Third rail required for *Double Rings*.



Double gate Arrangement

Values shown are nominal and not to be used for installation purposes. See product specification for installation requirements.

COMMERCIAL STRENGTH WELDED STEEL GATES

Title: **MONTAGE PLUS MAJESTIC 2/3-RAIL SGL & DBL GATE**

DR: CI	SH . 1 of 1	SCALE: DO NOT SCALE
CK: ME	Date 6/28/10	REV: e



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Goalsetter MVP Goal – or approved equal

Home > Adjustable In Ground > Signature Series > MVP

MVP

ADJUSTABLE IN-GROUND SIGNATURE SERIES

The unmatched craftsmanship, durability, and performance of the Goalsetter MVP make it the industry's premier playground basketball goal. The MVP system offers a massive 72" square off-set rear with 1/2" wall thickness and full 4" x 6" square ground anchor for ultimate stability. The competition size 42" x 72" Acrylic backboard exceeds the demands of today's outdoor playgrounds and provides a full safe C safety play area. With the simple ease of the height adjustment handle, the MVP will infinitely adjust from 6' to 10' for maximum participation and enjoyment. Increased safety is achieved with the height adjustment mechanism inside the pole. The internal height adjustment mechanism enhances safety by eliminating pinch and grab points. This basketball goal is made in the USA with an attached Lifetime Warranty.

72" x 42" Steel Framed Backboard
4" Safe Play Extension From Pole To Backboard
6" x 6" Pole Size Square Offset Steel Pole
6' to 10' Adjustable Height

Backboard:
Rim:
Backboard Pad: **MADE IN USA**

FREE:

\$3,819.97

+ ADD TO BASKET

FIND A LOCAL STORE

★★★★★

WRITE A REVIEW

SPEC REVIEWS SHIPPING INSTALLATION MANUALS

BACKBOARD DETAILS

- 72" Wide x 42" High x 3/8" Thick
- Fully tempered glass backboard — acrylic backboard option also available
- No dead spots on backboard corners
- 1-1/2" structural steel H-frame — extra backboard stability and consistent ball response
- Nylon bushings at each joint point
- 1/8" thick steel bushings for rim mounting
- Rounded edges and corners for safer play

GOAL SYSTEM DETAILS

- Rim height is infinitely adjustable from 6' to 10' — patented internal compression height adjustment mechanism
- 6" square off set pole — minimizes shake and vibration
- One-piece structural steel post
- 7 gauge steel (3/16" wall thickness) on poles — much thicker than competing systems
- 3 Primer coat and 2 coats of baked-on acrylic enamel — superior to powder coated parts
- Wide grip, die formed monocoar arms — no cut and welded joints
- 4" extensions from post to backboard — safe play area
- Made in the USA
- Limited Lifetime Warranty

The patented internal compression height adjustment mechanism is inside the goal pole, increase safety and shielding parts from the elements. The 3-foot high, easy-to-reach crank handle can be replaced with a pin lock to prevent changing the basketball goal height.

The exclusive hinged ground-anchor system enables complete assembly of your basketball goal by 2-3 persons without ladders and a scaffold prior to raising it upright. A 42" square steel anchor

Goalsetter MVP – adjustable in –ground signature series

Backboard to be Acrylic

Rim: Double Static

Backboard Pad: Red

Pole Pad 6 Black in color

Note:

Contractor to weld backboard at the max height and paint weld with rust black proof paint

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Model #: T9F761216BLF

Global Industrial™ Outdoor Drinking Fountain & Bottle Filling Station w/ Filter, Blue

[View All Outdoor Bottle Filling Stations](#)

|
Questions & Answers (0)

Purchase Information

SELECT COLOR

Blue

- ✓ Simplified push button activation.
- ✓ Vandal-resistant bubbler.
- ✓ 3,500 gallon water filter, mounting kit, and hardware are included for easy installation in the field.

Provide visitors with clean, odor-free, and great tasting water with the Global Industrial™ Outdoor Drinking Fountain and Bottle Filling Station with Filter. This versatile unit can be stationed in recreational areas, school campuses, office complexes, and golf courses. The complete setup features two unique areas for hydration: one drinking fountain with a vandal-resistant and hood-guarded bubbler and one bottle filling station that helps reduce the use of plastic bottles. No electrical power is needed, keeping maintenance to a minimum while the GlobalPure™ water filter is certified to NSF/ANSI standard 42 for the

reduction or chlorine, taste, odor, and sediment and certified to NSF/ANSI standard 53 for the reduction of lead. ADA compliant. 1-Year Limited Warranty.

- Refined stainless steel powder coat finish.
 - Anti-theft screws secure components together.
 - Quick refilling station provides minimal splash.
 - Fountain is rated for inlet water pressure of 20-105 PSI.
- See more details

1

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[Read return policy](#)

Product Information
Specifications

Weights & Dimensions

Height	60-1/4 in
Drain Size	1-1/2 in
Depth	10-1/4 in
Width	30-7/8 in
Water Inlet Size	3/8 in

Product Details

Water Refilling Location	Upper
Refrigerated	No
Bottle Filling Activation	Push Button
Color	Blue
Water Refilling Stations	1
For Outdoor Use	Yes
Style	Outdoor Drinking Fountain w/ Bottle Filling Station

SOUTH SUMTER ART PARK

Number of Stations	2
Material	316 Stainless Steel
Standard Bubbler Stations	1
Manufacturers Part Number	761216BLF
Filter	Yes
Installation Type	Floor
Vandal Resistant	Yes
Cooler/Fountain Activation	Push Button
Brand	Global Industrial

Warranty

Warranty	1 yr
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Compliance & Certifications

ADA Compliant	Yes
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February 26, 2024

Mr. Charles W. Howell Jr, ASLA RLA
The Landplan Group South, Inc.
1206 Scott Street
Columbia, South Carolina 29201

Subject: **Report of Subsurface Exploration and Engineering Evaluation**
West End Park
West Oakland Avenue and Wright Street
Sumter, South Carolina
SUMMIT Project No. A24119.00040.000

Dear Mr. Howell:

SUMMIT ENGINEERING, LABORATORY & TESTING, P.C. (SUMMIT) is pleased to submit our Report of Subsurface Exploration and Engineering Evaluation for the proposed West End Park improvements located at the intersection of West Oakland Avenue and Wright Street in Sumter, South Carolina. Our services were performed in general accordance with our Proposal dated February 9, 2024. The purpose of our services was to explore the subsurface conditions at the subject site pertinent to site preparation and foundation design for the new restroom building and pavement support. This report contains a brief description of the project information provided to us, general site and subsurface conditions revealed during our geotechnical exploration and our general recommendations based on subsurface conditions for the proposed development.

Project and Site Description

The proposed project will consist of improvements to the existing park which will include a new restroom building and two parking areas. Access to the parking areas will be off of West Oakland Avenue and Dingle Street.

The proposed project site is located in Sumter South Carolina with entrances on West Oakland Avenue and Dingle Street, between Wright Street and Council Street. The property is partially developed and generally clear of heavy vegetation in the area of the proposed improvements.

Exploration Procedures

Our exploration included a site reconnaissance by a geotechnical engineer and the performance of three (3) hand-auger borings with Dynamic Cone Penetrometer (DCP) tests. The hand augers were advanced at selected locations across the site to depths ranging from 5 to 8 feet each. HA-1 and HA-2 were advanced at the location of the proposed parking areas and HA-3 was advanced in the area of the proposed restroom building. Additionally, three (3) infiltration tests were performed on site to aid in the design of stormwater systems.

The hand-auger borings were advanced by manually turning a steel auger into the ground, and the soils were visually classified in the field using the Unified Soil Classification System (USCS). DCP testing was performed at 1-foot intervals in hand augers to provide an indication of the soil support and suitability at each location. During DCP testing at the hand auger locations, the conical point of the DCP is first seated to penetrate loose cuttings, and then driven into the soil in additional increments of 1-3/4 inches with blows from a 15-pound hammer falling 20 inches. The number of hammer blows required to achieve this penetration is recorded and is an index to the soil strength and density.

Subsurface Conditions

General subsurface conditions encountered during our geotechnical exploration are described herein. Details of the subsurface conditions encountered by the hand-auger borings are attached. These logs represent our interpretation of the subsurface conditions based upon field data. Stratification lines on the logs represent approximate boundaries between soil types; however, the actual transition may be gradual. Material descriptions are based on visual classification from the hand-auger boring samples. The general subsurface conditions and their pertinent characteristics can be generalized as follows.

The hand auger borings generally encountered grass and topsoil ranging from around 2 to 3 inches in thickness around the site, however the topsoil is likely deeper in the areas of heavy vegetation and wooded areas around the site. In general, beneath the surficial soils, loose to medium dense silty sand, sand and sandy silt were encountered to an approximate depth of 8 feet below the existing grade. The average DCP values in the hand augers ranged from 5 to 9 blows per increment. ***In HA-3, the DCP values were slightly lower between 1 and 3 feet below grade with values averaging 4 blows per increment.***

Water level measurements were attempted for each hand-auger boring, and groundwater was not encountered at the time of drilling. Longer term groundwater measurements were not made. Each of the hand auger borings were backfilled with soil cuttings following subsurface water readings.

It should be noted that regional groundwater levels will fluctuate with seasonal and climatic changes and may be different at other times. The highest groundwater observations are normally encountered in late winter and early spring. Additionally, the near surface soil can be conducive to the development of temporarily high groundwater conditions (water ponding at the surface) following periods of inclement weather. If longer term water levels are crucial to the development of this site, we would recommend the installation of piezometers.

Site Preparation

Site preparation should begin with the removal of unsuitable surface materials. This should include clearing vegetation, stripping organic-laden topsoil, grubbing roots, and undercutting unsuitable surface soils to a minimum of 10 feet outside the structural limits. Stumps, taproots, and out of service abandoned utilities should be completely removed from building and pavement areas, and voids created should be cleaned and backfilled with well-compacted structural fill. The topsoil thickness was approximately 2 to 3 inches in the test locations; however, the thickness will vary in unexplored areas of the site. Thicker areas of topsoil could also be encountered in the heavily vegetated and wooded areas of the site. It is anticipated that some structural fill will be required in the building pad and paved areas around the site.

The site preparation process will disturb the subgrade soil. The disturbed subgrade should be densified to a more uniform consistency by making several perpendicular passes with a large roller. Following densification, we recommend that all areas to receive engineered fill or foundations be proof rolled with a loaded tandem axle dump truck or other similar heavy construction equipment to confirm the stability of the subgrade soils and detect the presence of soft or unstable areas. Our geotechnical engineer or his representative should observe the proof-rolling operations. Some of the softer near surface fill soils which were encountered in a few of the hand auger borings may need to be undercut if encountered. If proof-rolling reveals unstable conditions, the method of repair should be as directed by the project geotechnical engineer, but will likely consist of several options, such as undercutting the unsuitable soils and replacement with adequately compacted structural fill, scarifying and reconditioning, chemical treatment or the use of geotextiles or geogrids for ground stabilization.

During grading operations hidden features in the substratum may be encountered within the proposed construction area. Details regarding removal of deleterious material must be determined on a case-by-case basis, and, therefore, contract documents should include a contingency cost for the removal of subsurface features. Excavated areas should be backfilled in general accordance with the compacted fill recommendations presented herein. Site preparation monitoring by SUMMIT personnel is recommended.

We also recommend that site grading be performed during the period from late spring to early fall when groundwater levels are typically at their lowest levels. In addition, drying of any wet near-surface soils will be much easier to perform. Proof rolling the soils during the wetter winter months when the soils are typically wet may cause pumping or rutting and unsuitable soil conditions that will likely require over-excavation and replacement. Additionally, every effort should be made to maintain adequate drainage away from construction areas to reduce saturation of subsoils.

Structural Fill Material

Any near surface sands and silty sands can be utilized for site grading. The sandy silts may be suitable for use as structural fill depending on the condition of the soils and the amount of fines. Any granular onsite material can be used for mass grading operations; however, the moisture content of the soil must be monitored, especially during wetter/colder periods of the year. Mechanical assistance of the soil for drying may involve scarifying the soils with a dozer or discs to facilitate drainage and evaporation of water. Typically, during the period from mid-April through October, moisture contents can be reduced as much as 3% to 5% in one day when proper drying techniques as described above are properly implemented. If available, the use of reclaimers, pans and/or motor-graders may be appropriate to speed up the mechanical assistance process and create a uniform soil mass prior to compaction. *Adequate time should be allotted in the construction schedule for the drying operation.* Any silty clays and clays will be difficult to use for site grading and it is recommended that these soils be limited to landscape and non-structural areas.

If high plasticity silt or clay soils are encountered in unexplored areas of the site, these soils should not be used during grading activities as structural fill within the top three (3) feet of subgrade levels due to their shrink/swell potential. This soil may be used in non-structural or landscaped areas. In addition, structural fill material should have particle sizes of less than four (4) inches in diameter and should not have a maximum dry density of less than 90 pounds per cubic foot as determined by ASTM D-698 without approval from the geotechnical engineer.

If off-site soils are brought in to be used as structural fill, these soils should be free of organic/deleterious material and should be tested by SUMMIT for compliance with the above criteria prior to use on-site. If off-site soils are used, these soils should generally have low to moderate plasticity characteristics consistent with USCS material classifications of CL, ML, SC, SM or better as determined by ASTM D-2487.

All structural fill and backfill material should be placed in approximate eight to ten (8-10) inch thick loose lifts and compacted to 95 percent of the standard Proctor maximum dry density and to within (+/-) 3 percent of the fill's optimum moisture content as determined by ASTM D-698. The structural fill compaction requirement should be increased to 98 percent of the standard Proctor maximum dry density within the final foot beneath pavements and floor slabs. Some moisture conditioning of the soils (such as wetting and drying) may be required during the filling operation to obtain the required degree of compaction. Regular one-point proctors should be conducted to ensure that the most representative Proctor curve is being selected. Field density tests should be performed by SUMMIT on each lift of structural fill placed and at a frequency determined by the geotechnical engineer to verify compliance with project compaction specifications.

The contractor should exercise care after these soils have been compacted. If water is allowed to stand on the surface, these soils may become saturated. Therefore, the fill surface should be sloped to achieve positive drainage and to minimize water from ponding on the surface. If the surface becomes excessively wet, fill operations should be halted and our geotechnical engineer consulted for guidance. Testing of the fill material and compaction monitoring by our engineering technician is recommended during fill placement operations.

Foundation Recommendations

In general, the restroom building may be supported by conventional shallow foundations, provided subgrade repairs are performed in areas where organic, high plasticity, or saturated soils are present at the bearing grade. Foundations supported on properly compacted structural fill or approved natural materials may be designed for a net allowable soil bearing of 2,000 pounds per square foot (psf).

Provided that the existing loose soils are either undercut or stabilized, the proposed restroom building may be supported by conventional shallow foundations. Some loose soils with average DCP values of 4 below per increment were encountered between depths of 1 to 3 feet in the hand auger performed in the restroom building. If loose soils are encountered in the foundation excavations, they will need to be removed and replaced. It is recommended that all excavations and fill placement be performed under the full-time observation of SUMMIT.

Our analysis indicates, post-construction, static (i.e. not seismically-induced) settlement due to the assumed building loads will be on the order of 1 inch or less. Differential settlement is typically assumed to be about half of the total settlement. If actual structural loads will be greater than those assumed in this report, we should be provided with this information so that we can reevaluate settlement. This is important because higher structural loads will cause additional settlement.

Footing excavations should be evaluated to verify that the subsurface soils are capable of supporting the required structural load at that location by a SUMMIT representative. We recommend DCP (ASTM STP 399) testing at the column locations and at intervals not greater than 25 feet in continuous wall footings to confirm that the soils at the bearing grade are capable of supporting the required load. This evaluation will help determine if individual footings are directly underlain by suitable bearing material. It is recommended that the geotechnical engineer be retained to observe and test the soil foundation bearing materials.

There is a possibility that some undercut may be required in the footings if any soft near surface soils or debris are encountered around the site. If unsuitable bearing soils are encountered in footing excavations, the excavation should be extended deeper to suitable soils and the footing should bear on free draining stone such as 57 stone or properly compacted structural fill. Over excavation of footings should extend laterally beyond all edges of the footings at least 8 inches per foot of over excavation depth below footing base elevation. If structural fill is placed in the over excavated area, it should be compacted as described in Section 4.3 of this report. As an alternative, the footings could bear directly on suitable soils at the lower level or on a lean concrete (flowable fill) backfill placed in the over excavated area.

The base of all foundation excavations should be free of water, debris and loose soil prior to placing concrete. If subsurface water is encountered during excavation, the water level should be maintained at least one foot below excavations to help maintain bottom stability. Subsurface water can probably be controlled at the site by pumping from sumps located within the excavations. The effects of dewatering on nearby structures should be evaluated and are the responsibility of the designer of any dewatering system.

Concrete should be placed soon after excavating to reduce bearing soil disturbance. If the soils at bearing level become excessively dry, disturbed or saturated, the affected soil should be recompacted or removed prior to placing concrete. Place a lean concrete mud-mat over the bearing soils if the excavations must remain open for an extended period of time.

Pavement Considerations

Pavement sections should be underlain by stabilized on-site soils or a minimum of 18 inches of well-compacted structural fill. If on-site soils are used as backfill for the pavement sections, underdrains should be considered along the roadway sections to prevent water infiltration below the pavement sections. In order to minimize undercut in the paved areas, any wet soils can be disced and scarified to facilitate drying and then compacted in place after satisfactory drying is achieved. Any wet clayey soils will require significant discing and manipulation in order to achieve sufficient drying. Depending on the depth of fill, in some areas it may be possible to “bridge” over the soft subgrade soils with the use of a select granular fill and potentially geofabrics. The bridging option will be dependent on the depth of fill to be placed.

We have evaluated new flexible (asphalt) and rigid (concrete) pavements using the South Carolina Department of Transportation Pavements Design Guide and associated literature. Traffic loading data was not provided. Based on our experience with similar projects, we assume light-duty pavement will be subjected primarily to cars and light truck traffic and heavy-duty pavements will be subjected to heavy truck traffic. A rigid pavement section is recommended in areas subjected to repeated lateral loading (turning, stopping, and starting movements), such as a dumpster pad.

Based on our experience, properly prepared site soils and well-compacted controlled fill for this area will provide a CBR of at least 6. The CBR values should be confirmed during grading by engineering evaluation and field and laboratory testing. The following table presents our recommendations for minimum pavement sections.

Material	Flexible		Rigid
	Heavy Duty	Light Duty	Heavy Duty
Flexible Asphalt Pavement (inches) Asphaltic Concrete Surface Course	1.5	2.0	--
Flexible Asphalt Pavement (inches) Asphaltic Concrete Binder Course	1.5	--	--
Rigid Concrete Pavement (inches) 28-day Compressive Strength 4,000 psi w/ steel reinforcement	--	--	6.0
Aggregate Base Course Graded Aggregate Base Course (GABC)	8.0	6.0	4.0
Total Section Thicknesses (inches)	11.0	8.0	10.0

Our analyses indicate the light duty flexible pavement section has an allowable traffic volume of about 30,000 ESALs and the allowable traffic volume for the heavy duty flexible pavement section is approximately 80,000 ESALs. Based on our experience, this should be adequate for the assumed traffic and a typical 20-year pavement life. Construction traffic loads have not been provided, and construction traffic should be restricted from prepared subgrades and new pavements. If pavements must support construction traffic, staged construction or a thicker asphalt section will be required.

Once the final subgrade elevations can be provided and the subgrade soils in the pavement areas are identified, a laboratory soaked CBR test can be performed to verify the CBR values and determine if the pavement section can be modified. If the pavement loadings are different than the estimates, then a revised pavement design should be performed.

All pavements should be constructed on properly prepared, proof-rolled and stable soil subgrades approved by SUMMIT's geotechnical personnel. The base course should be compacted to at least 100% of the maximum dry density as determined by the modified Proctor compaction test (ASTM D 1557). In-place field density tests should be performed, and the area should be proof-rolled to confirm that the base course has been uniformly compacted. The thickness should not be deficient in any area by more than ½ inch. The asphalt pavement thickness should not be deficient by more than ¼ inch in any area. The average thickness of each pavement component should not be less than the specified thickness.

The majority of pavement sections incur their heaviest loads during the construction process. The construction loads are generally in excess of the design traffic loads. For this reason, we recommend that construction be staged to allow final preparation of the base course and paving to be performed near the end of the project when heavy construction equipment is not present.

All materials and workmanship should be in accordance with the South Carolina Department of Transportation's Standard Specifications for Highway Construction, 2007 Edition. Concrete pavement construction should be in accordance with applicable American Concrete Institute (ACI) guidelines.

The long-term performance of any pavement section is directly related to drainage of the base and subgrade. We emphasize that good base course and subgrade drainage is absolutely essential for successful pavement performance. Water buildup in the base course will result in premature pavement failures. The subgrade and pavement should be graded to provide rapid runoff to either the outer limits of the paved area or to catch basins so that standing water will not accumulate on the subgrade or pavement surfaces. Any areas that allow water or groundwater to enter the pavement system will require sub drains (i.e. French drains) installed to prevent water entry into the pavement base and subgrades.

Dewatering and Drainage Considerations

Subsurface water for the purposes of this report is defined as water encountered below the existing ground surface. Groundwater was not encountered in hand at the time of drilling. Longer term groundwater measurements were not made. Each of the hand auger borings were backfilled with soil cuttings following subsurface water readings.

Based on the hand augers, it does not appear that groundwater will be encountered during site grading or in foundation excavations, however, it is possible that groundwater may be encountered in any deeper utility excavations. It should be noted that fluctuations in subsurface water levels and soil moisture can be anticipated with changes in precipitation, runoff, season, and construction activities. The contractor should be prepared to dewater should water levels vary from those encountered during the drilling program. Construction during wet seasonal conditions (typically November through April) with heavy precipitation may result in a perched groundwater table or softening of the soils at the surface. These conditions could greatly influence the results of the proofroll, which may require that some stabilization of the subgrade would be necessary prior to the placement of structural fill. This could result in encountering subsurface water levels at elevations higher than those observed during our exploration.

Infiltration Testing

The infiltration testing was completed at three (3) locations identified as IT-1 to IT-3. The test holes were excavated to a depth of about 2 to 3 feet below current site grade by manually twisting a hand auger into the ground to the desired depth and widening the hole with clam-shell type post-hole diggers if necessary. Soil types were observed as the cuttings were removed from the borehole. After the holes were excavated, the sidewalls of the hole were scarified, a PVC sleeve matching the diameter of the excavation with 2 to 3 inches of clean gravel was used to prevent scouring and caving of the sidewalls of the hole while adding water. Water was poured into the hole and maintained at a level at least 1 foot above the bottom of the hole for at least 1 hour in order to saturate the soil prior to testing. The infiltration test was measured as the drop in water levels over a period of 30 minutes. The results are reported as the average of the readings. A summary of the results is provided below in Table IV Infiltration Test Results.

**TABLE IV
INFILTRATION TEST RESULTS**

Location	Infiltration Rate (in/hour)*
IT-1	8.5
IT-2	3.5
IT-3	>10

Infiltration rates may vary within the proposed site due to changes in elevation and subsurface conditions. The value provided is a field measured value and does not include a factor of safety. We would recommend that an appropriate factor of safety be used for the infiltration rates above.

Qualifications of Report

The engineering recommendations provided in this report are based on the information obtained from the subsurface exploration. However, unlike other engineering materials like steel and concrete, the extent and properties of geologic materials (soil) may vary significantly. Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions between borings will be different from those at the boring locations, that conditions are not as anticipated by the designers, or that the construction process has altered the subsurface conditions. This report does not reflect variations that may occur between the boring locations. Therefore, conditions on the site may vary between the discrete locations observed at the time of our subsurface exploration.

Closing

SUMMIT appreciates the opportunity to be of service to you on this project. If you have any questions concerning the information presented herein or if we can be of further assistance, please feel free to call us at (843) 606-6268.

Sincerely,
SUMMIT ENGINEERING, LABORATORY & TESTING, P.C.



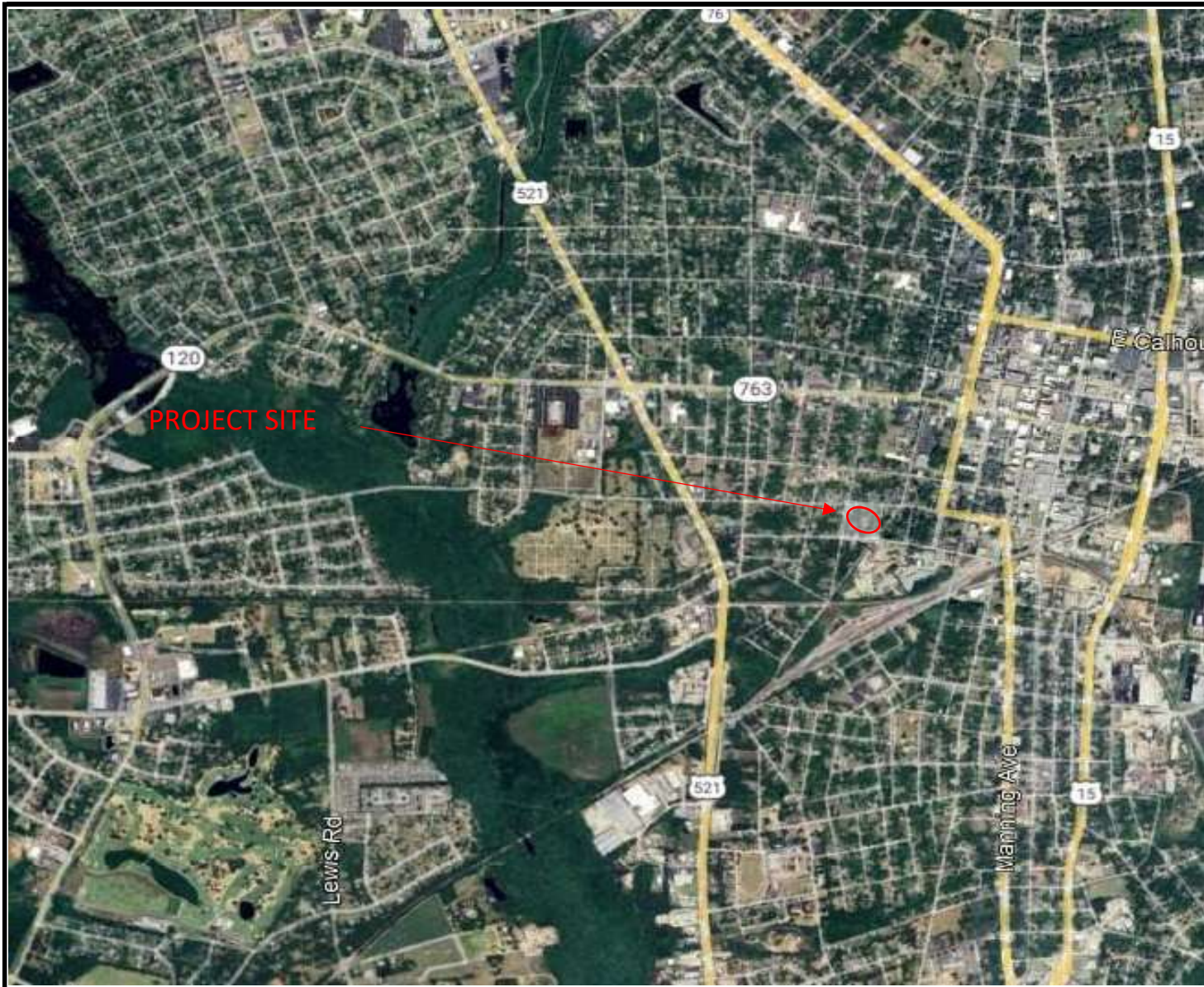
Ross Deaver, P.E.
SC Regional Manager



A handwritten signature in black ink that reads "John W. Colagrande, Jr.".

John W. Colagrande, Jr., P.E.
Senior Project Manager

- enc. Site Vicinity Map
- Test Location Plan
- Hand-Auger Boring Logs
- Important Information About this Geotechnical Engineering Report
- Constraints and Restrictions

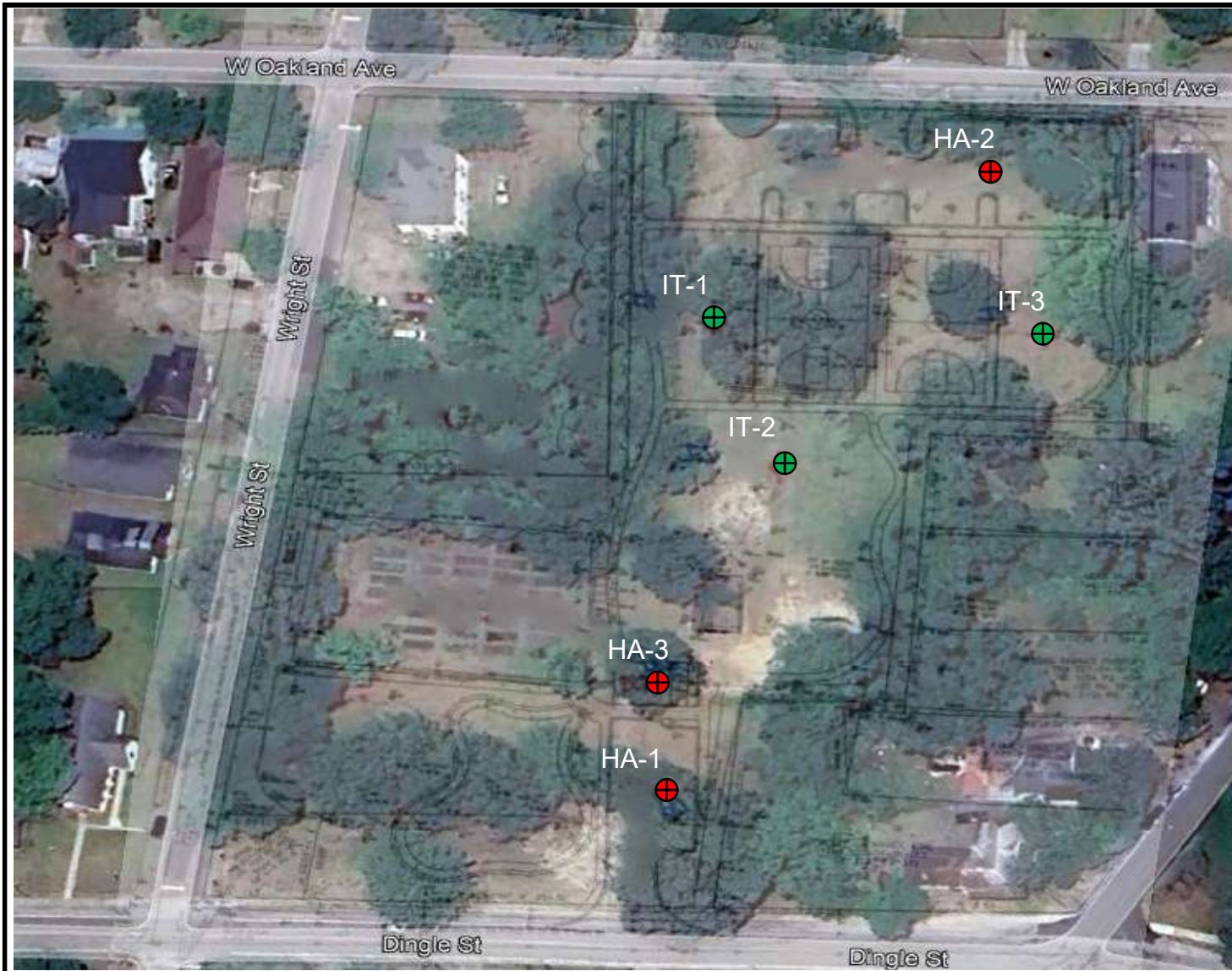


Summit Engineering, Laboratory & Testing, P.C.
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(843) 606-6268

WEST END PARK

West Oakland Ave
Sumter, South Carolina

SUMMIT Project No.
A24119.00040.000



⊕ Approximate Location of Hand Auger/DCP

⊕ Approximate Location of Infiltration Test



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 North Charleston, SC 29405
 (843) 606-6268

WEST END PARK

West Oakland Ave
 Sumter, South Carolina

SUMMIT Project No.
 A24119.00040.000



PROJECT NAME: West End Park		PROJECT NO.: A24119.00040.000
SITE ADDRESS: Sumter, SC		HAND AUGER NO.: HA-1
PREPARED BY: JW	DATE: 2/13/2024	SURFACE ELEVATION:
	LATITUDE:	LONGITUDE:

HAND AUGER LOG

DEPTH (FT)	WATER LEVELS	DESCRIPTION OF MATERIAL	SAMPLE NUMBER	EXCAVATION EFFORT	DCP VALUES
		Surface Material and Thickness: Grass/Topsoil +/- 3 inches			7
		Lt Grey Sandy Silt, SM			8
1					7
					9
					9
2					10
					8
					9
3					9
					10
					11
4					11
					8
					10
5					10
		EOB 5'-0"			9
					11
6					12
7					
8					
9					

COMMENTS:

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PROJECT NAME: West End Park		PROJECT NO.: A24119.00040.000
SITE ADDRESS: Sumter, SC		HAND AUGER NO.: HA-2
PREPARED BY: JW	DATE: 2/13/2024	SURFACE ELEVATION:
	LATITUDE:	LONGITUDE:

HAND AUGER LOG

DEPTH (FT)	WATER LEVELS	DESCRIPTION OF MATERIAL	SAMPLE NUMBER	EXCAVATION EFFORT	DCP VALUES
1		Surface Material and Thickness: Grass/Topsoil +/- 3 inches			6
		White/Lt Grey Silty Sand, SM			7
		6			
2			4		
			5		
			4		
3			8		
			8		
			9		
4			7		
		7			
		8			
5		6			
		7			
		8			
6		EOB 5'-0"	7		
		9			
		10			
7					
8					
9					

COMMENTS:

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PROJECT NAME: West End Park		PROJECT NO.: A24119.00040.000
SITE ADDRESS: Sumter, SC		HAND AUGER NO.: HA-3
PREPARED BY: JW	DATE: 2/13/2024	SURFACE ELEVATION:
	LATITUDE:	LONGITUDE:

HAND AUGER LOG

DEPTH (FT)	WATER LEVELS	DESCRIPTION OF MATERIAL	SAMPLE NUMBER	EXCAVATION EFFORT	DCP VALUES
1		Surface Material and Thickness: Grass/Topsoil +/- 3 inches			6
		Lt Brown Silty Sand, SM			6
2					7
					4
					4
3					4
					7
					8
4					8
					3
					4
5					5
					9
					9
6					10
					8
					8
7					9
					9
					10
8					7
					7
					8
9		EOB 8'-0"			8
					7
					8

COMMENTS:

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply this report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an

assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time to perform additional study.* Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help

others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold-prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical-engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your GBC-Member geotechnical engineer for more information.



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CONSTRAINTS & RESTRICTIONS

The intent of this document is to bring to your attention the potential concerns and the basic limitations of a typical geotechnical report.

WARRANTY

Universal Engineering Sciences has prepared this report for our client for his exclusive use, in accordance with generally accepted soil and foundation engineering practices, and makes no other warranty either expressed or implied as to the professional advice provided in the report.

UNANTICIPATED SOIL CONDITIONS

The analysis and recommendations submitted in this report are based upon the data obtained from soil borings performed at the locations indicated on the Boring Location Plan. This report does not reflect any variations which may occur between these borings.

The nature and extent of variations between borings may not become known until excavation begins. If variations appear, we may have to re-evaluate our recommendations after performing on-site observations and noting the characteristics of any variations.

CHANGED CONDITIONS

We recommend that the specifications for the project require that the contractor immediately notify Universal Engineering Sciences, as well as the owner, when subsurface conditions are encountered that are different from those present in this report.

No claim by the contractor for any conditions differing from those anticipated in the plans, specifications, and those found in this report, should be allowed unless the contractor notifies the owner and Universal Engineering Sciences of such changed conditions. Further, we recommend that all foundation work and site improvements be observed by a representative of Universal Engineering Sciences to monitor field conditions and changes, to verify design assumptions and to evaluate and recommend any appropriate modifications to this report.

MISINTERPRETATION OF SOIL ENGINEERING REPORT

Universal Engineering Sciences is responsible for the conclusions and opinions contained within this report based upon the data relating only to the specific project and location discussed herein. If the conclusions or recommendations based upon the data presented are made by others, those conclusions or recommendations are not the responsibility of Universal Engineering Sciences.

CHANGED STRUCTURE OR LOCATION

This report was prepared in order to aid in the evaluation of this project and to assist the architect or engineer in the design of this project. If any changes in the design or location of the structure as outlined in this report are planned, or if any structures are included or added that are not discussed in the report, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions modified or approved by Universal Engineering Sciences.

USE OF REPORT BY BIDDERS

Bidders who are examining the report prior to submission of a bid are cautioned that this report was prepared as an aid to the designers of the project and it may affect actual construction operations.

Bidders are urged to make their own soil borings, test pits, test caissons or other investigations to determine those conditions that may affect construction operations. Universal Engineering Sciences cannot be responsible for any interpretations made from this report or the attached boring logs with regard to their adequacy in reflecting subsurface conditions which will affect construction operations.

STRATA CHANGES

Strata changes are indicated by a definite line on the boring logs which accompany this report. However, the actual change in the ground may be more gradual. Where changes occur between soil samples, the location of the change must necessarily be estimated using all available information and may not be shown at the exact depth.

OBSERVATIONS DURING DRILLING

Attempts are made to detect and/or identify occurrences during drilling and sampling, such as: water level, boulders, zones of lost circulation, relative ease or resistance to drilling progress, unusual sample recovery, variation of driving resistance, obstructions, etc.; however, lack of mention does not preclude their presence.

WATER LEVELS

Water level readings have been made in the drill holes during drilling and they indicate normally occurring conditions. Water levels may not have been stabilized at the last reading. This data has been reviewed and interpretations made in this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, tides, and other factors not evident at the time measurements were made and reported. Since the probability of such variations is anticipated, design drawings and specifications should accommodate such possibilities and construction planning should be based upon such assumptions of variations.

LOCATION OF BURIED OBJECTS

All users of this report are cautioned that there was no requirement for Universal Engineering Sciences to attempt to locate any man-made buried objects during the course of this exploration and that no attempt was made by Universal Engineering Sciences to locate any such buried objects. Universal Engineering Sciences cannot be responsible for any buried man-made objects which are subsequently encountered during construction that are not discussed within the text of this report.

TIME

This report reflects the soil conditions at the time of exploration. If the report is not used in a reasonable amount of time, significant changes to the site may occur and additional reviews may be required.



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DIVISION 03 CONCRETE

03 30 00 CAST-IN-PLACE CONCRETE

1.1 GENERAL

- A. See Structural Drawings for detailed project notes and specifications for concrete work. Any discrepancies between the Structural Drawings/Specifications and this document, shall be brought to the Architect's attention immediately for clarification before work proceeds.
- B. All workmanship, materials and practices of concrete design and construction not specifically covered herein shall be governed by the standards of the American Concrete Institute building code requirements for structural concrete, and the Portland Cement Association.
- C. Cooperate with other trades regarding installation of embedded items and install anchors, bolts, ties, etc. as required.

1.2 STORAGE OF MATERIALS

- A. Store cement off ground on platforms and protect from the elements.
- B. Provide cover for reinforcement prior to use. Remove any rust or scale from reinforcement before placing.

1.3 CONCRETE FORM WORK

- A. Construct forms to slope lines and dimensions shown, plumb and straight and sufficiently tight to prevent leakage.
- B. Securely brace and shore forms to prevent displacement and to safely support construction loads.
- C. Keep forms wet as necessary to prevent shrinkage.

1.4 CONCRETE REINFORCEMENT

- A. Reinforcing steel: New billet steel, conforming to ASTM A615, Grade 60.
- B. Steel fabric reinforcing: ASTM A185, 6"x 6" W2.9 x W2.9, 6" x 6" W1.4 x W1.4, or as shown on the Structural and Civil drawings, spot-welded at intersections. Use at all slabs (interior and exterior) unless otherwise noted. See Civil and Structural Drawings.
- C. Support all reinforcing at proper distances from face of concrete; no wood supports will be allowed. Wire mesh shall be lapped at least twelve (12) inches.

1.5 EXPANSION JOINTS

- A. Pre-molded 1/2" thick asphalt-saturated coarse fiber, as manufactured by Celotex Corporation, J&P Petroleum Products, or approved equal.
- B. Keyed joint from pre-formed construction joint by J&P Petroleum Products or Vulcan, or approved equal.
- C. Concrete shall be installed so that no pour exceeds 1600 square feet with no side of pour exceeding 40 feet in length and as other indicated on the drawings. The Contractor shall submit a proposed pouring sequence to the Architect for approval and location and layout of joints shall be approved by the Architect prior to pouring concrete.

1.6 VAPOR BARRIER

- A. Under all building slabs on grade: .006 polyethylene membrane, Visqueen, or approved equal. Lap joints 8" minimum.

1.7 FIBER MESH REINFORCING

- A. Where shown on the drawings, and if approved by the project Structural Engineer, provide fiber mesh reinforcing 1.5 pounds per cubic yard. Fiber mesh shall be "Hi-Tech Commercial Fibers" by Martin Color-Fi or approved equal. Add to redi-mix concrete as per manufacturer's instructions.

1.8 CONCRETE

- A. Concrete shall be furnished by a ready mix plant. No water shall be added in the field either for placing or finishing. Slump shall be no more than 4 inches. All concrete shall obtain a minimum compressive strength of 3,000 PSI or 4,000 PSI at 28 days, as per the requirements of the Structural and/or Civil Drawings.

1.10 PLACING CONCRETE

- A. Place no concrete until all anchors, bolts, ties, reinforcing, pipes, conduits and vapor barriers have been placed and inspected by the Architect.
- B. Before placing concrete set continuous expansion joint strips where indicated or otherwise where concrete edge of slab abuts a vertical surface; seal joints tightly around pipes penetrating floors using asphalt mastic.
- C. Concrete shall be placed only when the temperature is 40 degrees Fahrenheit and rising or above.
- D. Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to re-handling or flowing. Concrete shall not be subjected to any procedure which will cause segregation. Concrete shall not be dropped onto exposed earth from a distance of more than 3 feet unless approved by the Architect.
- E. Concrete shall be in its final position within 90 minutes after its ingredients are mixed together. No concrete addition shall be used without permission from the Architect.
- F. Pitch of slabs: On exterior horizontal surfaces, slabs with floor drains, or where indicated on drawings, a slope shall be provided to remove water. If the slope is not indicated, the slab shall be finished with a slope of 1" per 12' so that water will not puddle.

2.1 PROTECTION AND CURING

Protect concrete against frost, temperatures below 40 degrees and rapid drying, and keep moist for at least 7 days after placing.

2.2 FINISHING

- A. Finish concrete in accordance with current ACI and PCA Standards of Practice.
- B. Exterior walks, slabs and ramps: All exterior concrete slabs shall have a broom finish of a texture approved by the Architect.
- C. Interior Slabs: All interior floor slabs shall have a steel trowel finish with no addition of dry cement and sand. Troweling shall be delayed until concrete has stiffened to a degree that no free water is drawn to the top of the slab by troweling.

2.3 INSPECTION AND TESTS

- A. Slump tests shall be made following ASTM Specifications C-143 and C-138 respectively.
- B. Cylinder tests shall be made as follows: Three (3) compressive test cylinders shall be required for each pour of each class of concrete and not less than one test (3 cylinders) for each 100 C.Y. of each class of concrete (or fraction thereof) placed on any one day.
 - 1. The testing of concrete at the project site is part of Chapter 17 Special Inspections and is to be paid for by the Owner's testing consultants.
 - 2. Compressive strength test to follow ASTM method of Test C-39.
 - 3. Cylinders to be made by the Owner's testing vendor. Tag each with an approved label.
 - 4. Cylinders to be tested by an approved laboratory at the Contractor's expense. Original reports shall be sent directly to the Architect. Test one cylinder and 7 days and the other two at 28 days.

END OF DIVISION 03

DIVISION 04 MASONRY

04 20 00 UNIT MASONRY

1.1 GENERAL

- A. See Structural Drawings for detailed project notes and specifications for masonry work. Any discrepancies between the Structural Drawings/Specifications and this document, shall be brought to the Architect's attention immediately for clarification before work proceeds.
- B. All materials, principals and practices of concrete masonry design and construction , such as control joints, bond beams, joint reinforcement, intersecting walls, etc. not specifically covered herein or on the drawings, shall be governed by the standards as set forth by the Portland Cement Association and the National Concrete Masonry Association.
- C. Cooperate with other trades regarding installation of embedded items and install anchors, bolts, ties, etc., as required.

1.2 PROTECTION OF MATERIALS

- A. Protect all materials in storage and in place from damage.
- B. Keep all walls dry by covering at end of day's work.
- C. Lay no masonry unless outside temperature is 40 degrees Fahrenheit and rising.

1.3 CLEANING AND POINTING MASONRY

- A. Pursue work in as clean a manner as possible. Remove excess materials and mortar droppings daily. Remove mortar droppings on adjacent work before final set.
- B. Upon completion of all masonry, the work shall be thoroughly roughly cleaned using stiff fiber brushes and a cleaning solution as recommended by manufacturer of masonry units.

- C. The Contractor and subcontractor shall follow the recommendations of the Portland Cement Association and the National Concrete Masonry Association concerning the avoidance of efflorescence and the cleaning of efflorescence of masonry.

1.4 LAYING MASONRY

- A. All brick and block shall be laid plumb, level and true to line in full mortar so as to fill all joints, both horizontal and vertical, completely full of mortar. Joints shall be uniform, matching joint width of adjacent existing joints where installed in existing construction, and shall match and member with existing coursing where required. Type of joint shall be selected by the Architect.
- B. Brick coursing shall be established as approved by the Architect. Joints shall be uniform, approximately 3/8" wide. Modular size brick will be used on this project. Three vertical brick courses and three joints shall equal approximately eight (8") inches. One vertical block course and one block joint shall equal eight (8") inches.
- C. Lay all walls and piers in running bond unless indicated otherwise on drawings. Edges of all brick and blocks shall be straight and true, free and clear from chips and cracks.
- D. All cutting shall be done with a masonry saw.

1.5 CONCEALED BASE FLASHING AND BASE FLASHING ACCESSORIES

- A. Composite Flexible Base Flashing shall be self-sealing, self-healing, fully adhering composite flexible flashing consisting of 32 mil thick pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8 mil thick, high-density, four plies of cross-laminated polyethylene film to produce an overall 40 mil thickness. This flashing shall be protected from contamination from dust or dirt by a silicone-coated release sheet to be removed immediately before installation.
- B. Surface Conditioner for Composite Flexible Base Flashing shall be latex-based, water soluble liquid for substrate preparation.

- C. Termination Mastic for Composite Flexible Base Flashing shall be as recommended by the manufacturer.

1.6 REINFORCEMENT AND ACCESSORIES

- A. **Uncoated-Steel Reinforcing Bars:** ASTM A 615/A 615M OR ASTM 996/A 996M.
- B. **Masonry Joint Reinforcement, General:** ASTM A951/A 951M.
 - 1. Interior and Exterior Walls: Hot-dip galvanized carbon steel.
 - 2. Wire Size for Side Rods: 0.148-inch (3.77 mm) diam.
 - 3. Wire Size for Cross Rods: 0.148-inch (3.77 mm) diam.
 - 4. Wire Size for Veneer Ties: 0.148-inch (3.77 mm) diam.
 - 5. Spacing of Cross Rods, Tabs and Cross Ties: Not more than 16 inches o.c.
 - 6. Provide in lengths not less than 10 feet, with pre-fabricated corner and tee units.
- C. **Masonry Joint Reinforcement for Single-wythe Masonry:** Ladder type with single pair of rods (12" or 8" width as required).
- D. **Masonry Joint Reinforcement for Multi-wythe Masonry:**
 - 1. Adjustable (two-piece) type, ladder design, with one side rod at each face shell of backing wythe and with separate adjustable ties with pintle-and-eye connections, having a maximum horizontal play of 1/16 inch (1.5 mm) and maximum vertical adjustment of 1-1/4 inches (32 mm). Size ties to extend at least halfway through facing wythe, but with at least 5/8" (16 mm) cover on outside face for Seismic Zone D.
- E. **Compressible Filler:** Pre-molded filler strips complying with ASTM D 1056, Grade 2A1, compressible up to 35 percent, of width and thickness indicated; formulated from neoprene urethane or PVC.
- F. **Bond Breaker Strips:** Asphalt-saturated felt strips complying with ASTM D 226/D 226M, Type 1 (No. 15 Asphalt Felt).

1.7 MORTAR

- A. Above ground: Type "S" mortar by Santee, Giant or Magnolia.
- B. Below grade and in contact with earth: Type "M" mortar by Santee, Giant or Magnolia.

1.8 CONCRETE MASONRY UNITS

- A. Concrete block shall be ASTM c-90, Grade A, Standard Weight Concrete Block. Each block shall attain a minimum strength of 100 p.s.i. in 7 days.
- B. Install units as recommended by manufacturer and as approved by the Architect.

END OF DIVISION 04

DIVISION 05 METALS

05 12 00 STRUCTURAL STEEL FRAMING

1.1 GENERAL

- A. See Structural Drawings for detailed project notes and specifications for structural steel work. Any discrepancies between the Structural Drawings/Specifications and this document, shall be brought to the Architect's attention immediately for clarification before work proceeds.
- B. The Contractor shall furnish and install all columns, trusses, frames, girders, beams, angles, lintels, joists, bearing plates, anchor bolts, channels, structural steel, and other metal items as shown on or required by the drawings and as herein specified or reasonably implied.
- C. The "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction shall be considered as a part of this specification.

1.2 MATERIALS

- A. Steel: ASTM A-36; Tubes: ASTM A500; steel joists: steel joist institute.
- B. High Strength Bolts: A325 bolts with threading excluded from the shear planes, unless otherwise noted on drawings.
- C. Machine Bolts: ASTM Specifications for Structural Steel for Bridges and Buildings.

1.3 CONNECTIONS

- A. Shop: welded
- B. Field: 3/4" high strength bolts, unless otherwise noted.
- C. All connections shall develop the full strength of the member and/or the loads shown on the drawings.
- D. No connection shall have less than four bolts.

1.4 WORKMANSHIP

- A. All workmanship shall meet AISC Specifications “The Design, Fabrication and Erection of Structural Steel for Buildings.”
- B. Dissimilar metals: Where dissimilar metals come in contact with each other, paint each surface with heavy coat of asphalt paint or otherwise insulate from each other to prevent galvanic action.

1.5 SHOP DRAWINGS

- A. A minimum of three (3) sets of Shop Drawings comparable to those in AISC “Structural Steel Detailing” shall be prepared by fabricator and submitted to Architect for review in accordance with General Conditions.

1.6 ERECTION

- A. All erection shall meet AISC Specification, “The Design, Fabrication and Erection of Structural Steel for Buildings.”

1.7 ANCHOR BOLTS AND COLUMN BASE SETTINGS

- A. Where exposed to view and/or weather, all anchor bolts shall be hot double-dipped galvanized.
- B. Column base plates shall be thoroughly grouted to elevation shown on plans. Grout shall consist of Embecco grout or approved equal.

1.8 QUALITY CONTROL

- A. All bolts shall achieve 380 lbs. of torque.

END OF DIVISION 05

DIVISION 06 WOOD, PLASTICS, AND COMPOSITES

06 00 00 GENERAL

- A. Lumber must be sound, thoroughly seasoned, well manufactured and free from warp. All lumber shall comply with the American Lumber Standard using only the recognized official marks of the Association under whose rules it is graded.

- B. Moisture content shall not exceed 19 percent (19%) for framing lumber and 15 percent (15%) for millwork and finish lumber.

- C. Treated Lumber: All lumber touching concrete or masonry, or exposed to the weather or roof deck, or used to apply or hold in place the roof flashing and where indicated on the drawings or specifications, and unless specified otherwise, shall be pressure treated WOLMONIZED using Kopper WOLMAN CCA treatment or approved equal in accordance with the latest specifications for treatment of Koppers Co., Inc.

06 10 00 ROUGH CARPENTRY

- A. Where required by job conditions, provide all sills, joists, studs, bracing, furring, blocking and rough hardware, such as nails, bolts, anchors as needed for a complete installation. Concealed blocking to include, but is not limited to that which is required to install overhead cabinets, grab bars, baby changing stations, urinal screens and toilet room equipment.
- B. Wood framing shall be cut square on bearing, closely filled, accurately set to required lines and levels, and rigidly secured in place.
- C. Where wood structural members, wood blocking and anchoring elements are used to anchor items used by disabled persons, all such elements shall meet the minimum requirements for structural strength of the Americans with Disabilities Act of 1991.
- D. Concealed framing lumber, including all concealed blocking , bracing and furring shall be Standard Grade Spruce or Construction Grade Cedar or better.

06 17 53 SHOP-FABRICATED WOOD TRUSSES

- A. See Structural Drawings for detailed project notes and specifications for wood trusses. Any discrepancies between the Structural Drawing/Specifications and this document shall be brought to the Architect's attention immediately, for clarification, before work proceeds.
- B. Furnish and install over the entire roof area a wood trussed rafter system with clear span as shown on drawings supporting roof system. Trusses to be designed to support a roof live load of 20 pounds per square foot, dead load of 15 pounds per square foot, ceiling load of 15 pounds p.s.f., wind pressure of 30 pounds p.s.f., seismic forces in accordance with the 2006 International Building Code. No reduction in live load for short duration loading. Maximum spacing shall be 24" on center.
- C. Design standards shall conform with the applicable provision of the *National Design Specification for Wood Construction* published by The National Forest Products Association and the *Design Specification for Light Metal Plate Connected Wood Trusses* published by The Truss Plate Institute.
- D. Truss design and connector plates shall be by Alpine Engineered Products, Inc. or approved equal; and fabrication by Builder's First Choice of Sumter, South Carolina or an approved equal. Furnish shop drawings and design calculations bearing the seal of an engineer registered in South Carolina for review prior to fabrication.
- E. Trusses to be constructed of No. 2 Southern Yellow Pine or better. Truss fabricator to provide all bridging, plates and straps required for anchoring of and connecting to or between trusses and as otherwise indicated on the drawings.
- F. Where wood is treated, all plates and connectors are to be stainless steel or other non-corroding metal suitable for use with the treatment of the wood.
 - 1. Wood connectors: Where called for on the drawings, furnish and install galvanized strong-tie connectors by Simpson or approved equal in shapes and sizes indicated on the DRAWINGS.

END OF DIVISION 06

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SECTION 06 10 10 CARPENTRY

PART 1 – GENERAL

1.1 DESCRIPTION:

Section specifies wood blocking, framing, sheathing, furring, nailers, sub-flooring, rough hardware, and light wood construction.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings showing framing connection details, fasteners, connections and dimensions.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect lumber and other products from dampness both during and after delivery at site.
- B. Pile lumber in stacks in such manner as to provide air circulation around surfaces of each piece.
- C. Stack plywood and other board products so as to prevent warping.
- D. Locate stacks on well drained areas, supported at least (6 inches) above grade and cover with well ventilated sheds having firmly constructed over hanging roof with sufficient end wall to protect lumber from driving rain.

1.5 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to extent referenced.
Publications are referenced in the text by basic designation only.
- B. American Forest and Paper Association (AFPA):
National Design Specification for Wood Construction
NDS-05Conventional Wood Frame Construction
- C. American Institute of Timber Construction (AITC):
A190.1-07Structural Glued Laminated Timber
- D. American Society of Mechanical Engineers (ASME):

- B18.2.1-96(R2005)Square and Hex Bolts and Screws
- B18.2.2-87.....Square and Hex Nuts
- B18.6.1-97.....Wood Screws
- B18.6.4-98(R2005)Thread Forming and Thread Cutting Tapping Screws and
Metallic Drive Screws
- E. American Plywood Association (APA):
 - E30-07.....Engineered Wood Construction Guide
- F. American Society for Testing And Materials (ASTM):
 - A47-99(R2009)Ferritic Malleable Iron Castings
 - A48-03(R2008)Gray Iron Castings
 - A653/A653M-10.....Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy
Coated (Galvannealed) by the Hot Dip Process
 - C954-10.....Steel Drill Screws for the Application of Gypsum Board or
Metal Plaster Bases to Steel Studs from 0.033 inch (2.24
mm) to 0.112-inch (2.84 mm) in thickness
 - C1002-07.....Steel Self-Piercing Tapping Screws for the Application of
Gypsum Panel Products or Metal Plaster Bases to Wood
Studs or Metal Studs
 - D143-09Small Clear Specimens of Timber, Method of Testing
 - D1760-01Pressure Treatment of Timber Products
 - D2559-10Adhesives for Structural Laminated Wood Products for Use
Under Exterior (Wet Use) Exposure Conditions
 - D3498-11Adhesives for Field-Gluing Plywood to Lumber Framing
for Floor Systems
 - F844-07Washers, Steel, Plan (Flat) Unhardened for General Use
 - F1667-08.....Nails, Spikes, and Staples
- G. Federal Specifications (Fed. Spec.):
 - MM-L-736C.....Lumber; Hardwood
- H. Commercial Item Description (CID):
 - A-A-55615Shield, Expansion (Wood Screw and Lag Bolt Self
Threading Anchors)

- I. Military Specification (Mil. Spec.):
MIL-L-19140E.....Lumber and Plywood, Fire-Retardant Treated
- J. Truss Plate Institute (TPI):
TPI-85Metal Plate Connected Wood Trusses
- K. U.S. Department of Commerce Product Standard (PS)
PS 1-95.....Construction and Industrial Plywood
PS 20-05.....American Softwood Lumber Standard

PART 2 – PRODUCTS

2.1 LUMBER:

- A. Unless otherwise specified, each piece of lumber bear grade mark, stamp, or other identifying marks indicating grades of material, and rules or standards under which produced.
 - 1. Identifying marks in accordance with rule or standard under which material is produced, including requirements for qualifications and authority of the inspection organization, usage of authorized identification, and information included in the identification.
 - 2. Inspection agency for lumber approved by the Board of Review, American Lumber Standards Committee, to grade species used.
- B. Structural Members: Species and grade as listed in the AFPA, National Design Specification for Wood Construction having design stresses as shown.
- C. Lumber Other Than Structural:
 - 1. Unless otherwise specified, species graded under the grading rules of an inspection agency approved by Board of Review, American Lumber Standards Committee.
 - 2. Framing lumber: Minimum extreme fiber stress in bending of 1100.
 - 3. Furring, blocking, nailers and similar items (4 inches) and narrower Standard Grade; and, members 150 mm (6 inches) and wider, Number 2 Grade.
 - 4. Board Sub-flooring: Shiplap edge, (1 inch) thick, not less than (8 inches) wide. //

D. Sizes:

1. Conforming to Prod. Std., PS20.
2. Size references are nominal sizes, unless otherwise specified, actual sizes within manufacturing tolerances allowed by standard under which produced.

E. Moisture Content:

1. At time of delivery and maintained at the site.
2. Boards and lumber (2 inches) and less in thickness: 19 percent or less.
3. Lumber over (2 inches) thick: 25 percent or less.

F. Fire Retardant Treatment:

1. Mil Spec. MIL-L-19140 with piece of treated material bearing identification of testing agency and showing performance rating.
2. Treatment and performance inspection, by an independent and qualified testing agency that establishes performance ratings.

G. Preservative Treatment:

1. Do not treat Heart Redwood and Western Red Cedar.
2. Treat wood members and plywood exposed to weather or in contact with plaster, masonry or concrete, including framing of open roofed structures; sills, sole plates, furring, and sleepers that are less than (24 inches) from ground; nailers, edge strips, blocking, crickets, curbs, cant, vent strips and other members used in connection with roofing and flashing materials.
3. Treat other members specified as preservative treated (PT).
4. Preservative treat by the pressure method complying with ASTM D1760, except any process involving the use of Chromated Copper arsenate (CCA) for pressure treating wood is not permitted.

2.2 PLYWOOD

A. Comply with Prod. Std., PS 1.

B. Bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of plywood which identifies compliance by veneer grade, group number, span rating where applicable, and glue type.

C. Sheathing:

1. APA rated Exposure 1 or Exterior; panel grade CD or better.

2. Wall sheathing:
 - a. Minimum (11/32 inch) thick with supports (16 inches) on center and (15/32 inch) thick with supports (24 inches) on center unless specified otherwise.
 - b. Minimum (48 inches) wide at corners without corner bracing of framing.
3. Roof sheathing:
 - a. Minimum (11/32 inch) thick with span rating 24/0 or (15/32 inch) thick with span rating for supports (16 inches) on center unless specified otherwise.
 - b. Minimum (19/32 inch) thick or span rating of 40/20 or (23/32 inch) thick or span rating of 48/24 for supports (24 inches) on center.

D. Subflooring:

1. Under finish wood flooring or underlayment:
 - a. APA Rated sheathing, Exposure 1, panel grade CD.
 - b. Minimum (19/32 inch) thick with span rating 32/16 or greater for supports at (16 inches) on center and (23/32 inch) thick with span rating 48/24 for supports at (24 inches) on center.
2. Combination subflooring-underlayment under resilient flooring or carpet:
 - a. APA Rated Stud-I-Floor Exterior or Exposure 1, T and G.
 - b. Minimum (19/32 inch) thick or greater, span rating 16, for supports at (16 inches) on center; (23/32 inch) thick or greater, span rating 24, for supports at (24 inches) on center.
 - c. Minimum (3/4-inch) thick or greater, span rating 32, for supports at (32 inches) on center; (1-1/8 inch) thick, span rating 48 for supports at (48 inches) on center.

E. Underlayment:

1. APA rated Exposure 1 or Exterior, panel grade C-C Plugged.
2. Minimum (1/4 inch) thick or greater over plywood subflooring // and (3/8 inch) thick or greater over board subflooring, // unless otherwise shown.

2.3 STRUCTURAL-USE PANELS

- A. Comply with APA.

- B. Bearing the mark of a recognized association or independent agency that maintains continuing control over quality of panel which identifies compliance by end use, Span Rating, and exposure durability classification.
- C. Wall and Roof Sheathing:
 - 1. APA Rated sheathing panels, durability classification of Exposure 1 or Exterior Span Rating of 16/0 or greater for supports (16 inches) on center and 24/0 or greater for supports (24 inches) on center.
- D. Subflooring:
 - 1. Under finish wood flooring or underlayment:
 - a. APA rated sheathing panels, durability classification of Exposure 1 or Exterior.
 - b. Span Rating of 24/16 or greater for supports (16 inches) on
 - 2. Under resilient floor or carpet.
 - a. APA rated combination subfloor-underlayment grade panels, durability classification of Exposure 1 or Exterior T and G.
 - b. Span Rating of 16 or greater for supports (16 inches) on center and 24 or greater for supports (24 inches) on center.
- E. Underlayment:
 - 1. APA rated Exposure 1.
 - 2. Minimum (1/4 inch) thick or greater over subfloor.
- F. Wood "I" Beam Members:
 - 1. Size and Shape as shown.
 - 2. Cambered and marked "Top up".
 - 3. Plywood webs: PS-1, minimum (3/8 inch) thick, unless shown otherwise.
 - 4. Flanges: Kiln dried stress rated dense lumber minimum (1-1/2 inch) thick, width as shown.
 - 5. Plywood web fitted into flanges and joined with ASTM D2559 adhesive to form "I" beam section unless shown otherwise.
- G. Laminated Veneer Lumber (LVL):
 - 1. Bonded jointed wood veneers with ASTM D2559 adhesive.
 - 2. Scarf jointed wood veneers with grain of wood parallel.
 - 3. Size as shown.

2.4 ROUGH HARDWARE AND ADHESIVES:

A. Anchor Bolts:

1. ASME B18.2.1 and ANSI B18.2.2 galvanized, (1/2 inch) unless shown otherwise.
2. Extend at least (8 inches) into masonry or concrete with ends bent (2 inches).

B. Miscellaneous Bolts: Expansion Bolts: C1D, A-A-55615; lag bolt, long enough to extend at least (2-1/2 inches) into masonry or concrete. Use (1/2 inch) bolt unless shown otherwise.

C. Washers

1. ASTM F844.
2. Use zinc or cadmium coated steel or cast iron for washers exposed to weather.

D. Screws:

1. Wood to Wood: ANSI B18.6.1 or ASTM C1002.
2. Wood to Steel: ASTM C954, or ASTM C1002.

E. Nails:

1. Size and type best suited for purpose unless noted otherwise. Use aluminum-alloy nails, plated nails, or zinc-coated nails, for nailing wood work exposed to weather and on roof blocking.
2. ASTM F1667:
 - a. Common: Type I, Style 10.
 - b. Concrete: Type I, Style 11.
 - c. Barbed: Type I, Style 26.
 - d. Underlayment: Type I, Style 25.
 - e. Masonry: Type I, Style 27.
 - f. Use special nails designed for use with ties, strap anchors, framing connectors, joists hangers, and similar items. Nails not less than 32 mm (1-1/4 inches) long, 8d and deformed or annular ring shank.

F. Framing and Timber Connectors:

1. Fabricate of ASTM A446, Grade A; steel sheet not less than (0.052 inch) thick unless specified otherwise. Apply standard plating to steel timber connectors after punching, forming and assembly of parts.

2. Framing Angles: Angle designed with bendable legs to provide three way anchors.
3. Straps:
 - a. Designed to provide wind and seismic ties with sizes as shown or specified.
 - b. Strap ties not less than (1-1/4 inches) wide.
 - c. Punched for fastener.
4. Metal Bridging:
 - a. Optional to wood bridging.
 - b. V shape deformed strap with not less than 2 nail holes at ends, designed to nail to top and side of framing member and bottom and side of opposite member.
 - c. Not less than by (3/4 by 5 inches) bendable nailing flange on ends.
 - d. Fabricated of (0.04 inch) minimum thick sheet.
5. Joist Hangers:
 - a. Fabricated of (0.063 inch) minimum thick sheet, U design unless shown otherwise.
 - b. Heavy duty hangers fabricated of minimum (0.108 inch) thick sheet, U design with bent top flange to lap over beam.
6. Timber Connectors: Fabricated of steel to shapes shown.
7. Joist Ties: Mild steel flats, (3/16 by 1-1/4 inch size with ends bent about 30 degrees from horizontal, and extending at least (16 inches) onto framing. Punch each end for three spikes.
8. Wall Anchors for Joists and Rafters:
 - a. Mild steel strap, (3/16 by 1-1/4 inch) with wall ends bent 50 mm (2 inches), or provide (3/8 by 5 inch) pin through strap end built into masonry.
 - b. Strap long enough to extend onto three joists or rafters, and punched for spiking at each bearing.
 - c. Strap not less than (4 inches) embedded end.
9. Joint Plates:
 - a. Steel plate punched for nails.
 - b. Steel plates formed with teeth or prongs for mechanically clamping plates to wood.
 - c. Size for axial eccentricity, and fastener loads.

G. Adhesives:

1. For field-gluing plywood to lumber framing floor or roof systems: ASTM D3498.
2. For structural laminated Wood: ASTM D2559.

PART 3 – EXECUTION

3.1 INSTALLATION OF FRAMING AND MISCELLANEOUS WOOD MEMBERS:

A. Conform to applicable requirements of the following:

1. AFPA National Design Specification for Wood Construction for timber connectors.
2. AITC Timber Construction Manual for heavy timber construction.
3. AFPA WCD-number 1, Manual for House Framing for nailing and framing unless specified otherwise.
4. APA for installation of plywood or structural use panels.
5. ASTM F 499 for wood underlayment.
6. TPI for metal plate connected wood trusses.

B. Fasteners:

1. Nails.
 - a. Nail in accordance with the Recommended Nailing Schedule as specified in AFPA Manual for House Framing where detailed nailing requirements are not specified in nailing schedule. Select nail size and nail spacing sufficient to develop adequate strength for the connection without splitting the members.
 - b. Use special nails with framing connectors.
 - c. For sheathing and subflooring, select length of nails sufficient to extend (1 inch) into supports.
 - d. Use eight penny or larger nails for nailing through (1 inch) thick lumber and for toe nailing (2 inch) thick lumber.
 - e. Use 16 penny or larger nails for nailing through (2 inch) thick lumber.
 - f. Select the size and number of nails in accordance with the Nailing Schedule except for special nails with framing anchors.
 - g. Nailing Schedule; Using Common Nails:
 - 1) Joist bearing on sill or girder, toe nail three-8d or framing anchor
 - 2) Bridging to joist, toe nail each end two-8d

- 3) Ledger strip to beam or girder three-16d under each joint.
 - 4) Subflooring or Sheathing:
 - a) (6 inch) wide or less to each joist face nail two-8d.
 - b) Subflooring, more than (6 inches) wide, to each stud or joint, face nail three-8d.
 - c) Plywood or structural use panel to each stud or joist face nail 8d, at supported edges (6 inches) on center and at intermediate supports (10 inches) on center. When gluing plywood to joint framing increase nail spacing to (12 inches) at supported edges and (20 inches) o.c. at intermediate supports.
 - 5) Sole plate to joist or blocking, through sub floor face nail 20d nails, (16 inches) on center.
 - 6) Top plate to stud, end nail two-16d.
 - 7) Stud to sole plate, toe nail or framing anchor. Four-8d
 - 8) Doubled studs, face nail 16d at (24 inches) on center.
 - 9) Built-up corner studs 16d at (24 inches) (24 inches) on center.
 - 10) Doubled top plates, face nails 16d at (16 inches) on center.
 - 11) Top plates, laps, and intersections, face nail two-16d.
 - 12) Continuous header, two pieces 16d at (16 inches) on center along each edge.
 - 13) Ceiling joists to plate, toenail three-8d or framing anchor.
 - 14) Continuous header to stud, four 16d.
 - 15) Ceiling joists, laps over partitions, face nail three-16d or framing anchor.
 - 16) Ceiling joists, to parallel rafters, face nail three-16d.
 - 17) Rafter to plate, toe nail three-8d. or framing anchor. Brace (1 inch) thick board to each stud and plate, face nail three-8d.
 - 18) Built-up girders and beams 20d at (32 inches) on center along each edge.
2. Bolts:
- a. Fit bolt heads and nuts bearing on wood with washers.
 - b. Countersink bolt heads flush with the surface of nailers.

- c. Embed in concrete and solid masonry or use expansion bolts. Special bolts or screws designed for anchor to solid masonry or concrete in drilled holes may be used.
 - d. Use toggle bolts to hollow masonry or sheet metal.
 - e. Use bolts to steel over (0.112 inch, 11 gage) in thickness. Secure wood nailers to vertical structural steel members with bolts, placed one at ends of nailer and 600 mm (24 inch) intervals between end bolts. Use clips to beam flanges.
3. Drill Screws to steel less than (0.112 inch) thick.
 - a. ASTM C1002 for steel less than (0.033 inch) thick.
 - b. ASTM C 954 for steel over (0.033 inch) thick.
 4. Power actuated drive pins may be used where practical to anchor to solid masonry, concrete, or steel.
 5. Do not anchor to wood plugs or nailing blocks in masonry or concrete. Use metal plugs, inserts or similar fastening.
 6. Screws to Join Wood:
 - a. Where shown or option to nails.
 - b. ASTM C1002, sized to provide not less than (1 inch) penetration into anchorage member.
 - c. Spaced same as nails.
 7. Installation of Timber Connectors:
 - a. Conform to applicable requirements of the NFPA National Design Specification for Wood Construction.
 - b. Fit wood to connectors and drill holes for fasteners so wood is not split.
- C. Set sills or plates level in full bed of mortar on masonry or concrete walls.
1. Space anchor bolts (4 feet) on centers between ends and within (6 inches) of end. Stagger bolts from side to side on plates over (7 inches) in width.
 2. Use shims of slate, tile or similar approved material to level wood members resting on concrete or masonry. Do not use wood shims or wedges.
 3. Closely fit, and set to required lines.

D. Cut notch, or bore in accordance with NFPA Manual for House-Framing for passage of ducts wires, bolts, pipes, conduits and to accommodate other work. Repair or replace miscut, misfit or damaged work.

E. Blocking Nailers, and Furring:

1. Install furring, blocking, nailers, and grounds where shown.
2. Use longest lengths practicable.
3. Use fire retardant treated wood blocking where shown at openings and where shown or specified.
4. Layers of Blocking or Plates:
 - a. Stagger end joints between upper and lower pieces.
 - b. Nail at ends and not over (24 inches) between ends.
 - c. Stagger nails from side to side of wood member over (5 inches) in width.
5. Unless otherwise shown, use wall furring (1 inch by 3 inch) continuous wood strips installed plumb on walls, using wood shims where necessary so face of furring forms a true, even plane. Space furring not over (16 inches on centers, butt joints over bearings and rigidly secure in place. Anchor furring on (16 inches) centers. //

F. Floor / Ceiling Framing :

1. Set with crown edge up.
2. Bear on not less than (4 inches) on concrete and masonry, and (1-1/2 inches) on wood and metal unless shown otherwise.
3. Support joist, trimmer joists, headers, and beams framing into carrying members at same relative levels on joist hangers unless shown otherwise.
5. Lap and spike wood joists together at bearing, or butt end-to-end with scab ties at joint and spike to plates. Scab tie lengths not less than (8 inches) lap on joist ends. Install wood I beam joists as shown.
6. Frame openings with headers and trimmer joist. Double headers carrying more than two tail joists and trimmer joists supporting headers carrying more than one tail joist unless otherwise shown.
7. Drive nails through headers into joists using two nails for (2 inch by 6 inch); three nails for 50 mm by 200 mm (2 inch by 8 inch) and four nails for (2 inch by 10 inch) and over in size.

8. Install nearest joist to double headers and spike joist to both header members before trimmer joist is installed and secured together.
9. Doubled joists under partitions parallel with floor joists. // Fire cut joists built into masonry or concrete. //
10. Where joists run perpendicular to masonry or concrete, anchor every third joist to masonry or concrete with one metal wall anchor. Securely spike anchors with three nails to side of joist near its bottom.
11. Anchor joists running parallel with masonry or concrete walls to walls with steel flats spaced not over (6 feet) apart. Extend steel flats over at least three joists and into masonry (4 inches) with ends turned (2 inches); bolt to concrete. Set top of flats flush with top of joists, and securely nail steel flats to each joist.
12. Hook ties at steel framing over top flange of steel members.
13. Nonbearing partitions running parallel with ceiling joists, install solid (2 inch) thick bridging same depth as ceiling joists cut to fit snug between joists for securing top plate of partitions. Securely spike bridging to joists. Space (4 feet) on center.

G. Bridging:

1. Use (1 inch by 3 inch) lumber with ends beveled for slope. Option: Metal bridging may be used for wood bridging.
2. Install one row of bridging for joist spans over (8 feet), but less than (16 feet) long; install two rows for spans over (16 feet) long.
3. Install an extra row of bridging between trimmer and next two joists if header is more than (2 feet) from end of trimmer or from regular row of bridging.
4. Secure with two nails at ends.
5. Leave bottom ends loose until after subflooring or roof sheathing is installed.
6. Install single row of bridging at centerline of span and two rows at the third points of span unless otherwise shown.

H. Roof Framing:

1. Set rafters with crown edge up.
2. Form a true plane at tops of rafters.
3. Valley, Ridge, and Hip Members:
 - a. Size for depth of cut on rafters.

- b. Straight and true intersections of roof planes.
 - c. Secure hip and valley rafters to wall plates by using framing connectors.
 - d. Double valley rafters longer than the available lumber, with pieces lapped not less than (4 feet) and spiked together.
 - e. Butt joint and scab hip rafters longer than the available lumber.
- 4. Spike to wall plate and to ceiling joists except when secured with framing connectors.
 - 5. Frame openings in roof with headers and trimmer rafters. Double headers carrying more than one rafter unless shown otherwise.
 - 6. Install (2 inch by 4 inch) strut between roof rafters and ceiling joists at (4 feet) on center unless shown otherwise.
- I. Framing of Dormers:
- 1. Frame as shown, with top edge of ridge beveled to pitch of roof header.
 - 2. Set studs on doubled trimmer rafters.
 - 3. Double studs at corners of dormers.
 - 4. Double plate on studs and notch rafters over plate and bear at least (3 inches) on plates.
 - 5. Frame opening to receive window frame or louver frame.
- J. Partition and Wall Framing:
- 1. Use (2 inch by 4 inch) studs spaced (16 inches) on centers; unless shown otherwise.
 - 2. Install double studs at openings and triple studs at corners.
 - 3. Installation of sole plate:
 - a. Anchor plates of walls or partitions resting on concrete floors in place with expansion bolts, one near ends of piece and at intermediate intervals of not more than (4 feet) or with power actuated drive pins with threaded ends of suitable type and size, spaced 600 mm (2 feet) on center unless shown otherwise.
 - b. Nail plates to wood framing through subfloor as specified in nailing schedule.
 - 4. Headers or Lintels:
 - a. Make headers for openings of two pieces of (2 inch) thick lumber of size shown with plywood filler to finish flush with face of studs or solid lumber of equivalent size.

- b. Support ends of headers on top of stud cut for height of opening. Spike cut stud to adjacent stud. Spike adjacent stud to header.
5. Use double top plates, with members lapped at least (2-feet) spiked together.
6. Install intermediate cut studs over headers and under sills to maintain uniformity of stud spacing.
7. Use single sill plates at bottom of opening unless shown otherwise. Toe nail to end stud, face nail to intermediate studs.
8. Install (2 inch) blocking for firestopping so that maximum dimension of any concealed space is not over (8 feet) in accordance with NFPA Manual for House Framing.
9. Install corner bracing when plywood or structured use panel sheathing is not used.
 - a. Let corner bracing into exterior surfaces of studs at an angle of approximately 45 degrees, extended completely over walls plates, and secured at bearing with two nails.
 - b. Use (1 inch by 4 inch) corner bracing.

K. Rough Bucks:

1. Install rough wood bucks at opening in masonry or concrete where wood frames or trim occur.
2. Brace and maintain bucks plumb and true until masonry has been built around them or concrete cast in place.
3. Cut rough bucks from (2 inch) thick stock, of same width as partitions in which they occur and of width shown in exterior walls.
4. Extend bucks full height of openings and across head of openings; fasten securely with anchors specified.

L. Subflooring:

1. Subflooring may be either boards, structural-use panels, or plywood.
2. Lay board subflooring diagonally, with close joints. Stagger end joints and make joints over supports. Bear each board on at least three supports.
3. Provide a clearance of approximately (1/2 inch) at masonry or concrete at walls.

4. Apply plywood and structural-use panel subflooring with face grain or long dimension at right angles to the supports, with edges (1/4 inch) apart at side joints, and 3 mm (1/8 inch) apart at end joints.
5. Combination subfloor-underlayment:
 - a. Space edges (1/8 inch) apart.
 - b. Provide a clearance of (1/4 inch) at masonry on concrete at walls.
6. Stagger panel end joints and make over support.

M. Underlayment:

1. Where finish flooring of different thickness is used in adjoining areas, use underlayment of thickness required to bring finish flooring surfaces into same plane.
2. Apply to dry, level, securely nailed, clean, wood subfloor without any projections.
3. Fasten to subfloor as specified in ASTM F499.
4. Plywood and particle underlayment may be glue-nailed to subfloor.
5. Butt underlayment panels to a light contact with a (1/32 inch) space between plywood or hardboard underlayment panels and walls, and approximately (3/8 inch) between particleboard underlayment panels and walls.
6. Stagger underlayment panel end joints with respect to each other and offset joints with respect to joints in the subfloor at least (2 inches).
7. After installation, avoid traffic on underlayment and damage to its finish surface.

N. Sheathing:

1. Use plywood or structural-use panels for sheathing.
2. Lay panels with joints staggered, with edge and ends 3 mm (1/8 inch) apart and nailed over bearings as specified.
3. Set nails not less than (3/8 inch) from edges.
4. Install (2 inch by 4 inch) blocking spiked between joists, rafters and studs to support edge or end joints of panels.

End of Section

DIVISION 07 THERMAL AND MOISTURE PROTECTION

07 21 00 THERMAL INSULATION

- A. **VAPOR BARRIER:** Provide .006 polyethylene membrane under all concrete slabs on grade. Lap all joints 8" minimum. Grade shall be free of any sharp objects that would damage vapor barrier.

- B. **INSULATION:**
 - 1. **EXTERIOR ROOF AND WALL INSULATION** as called for on the drawings:
 - a. R-38 and R-19 unfaced batt fiberglass insulation by Owens-Corning or approved equal.

 - 2. **RIGID INSULATION** as called for on the drawings:
 - a. Foamlar - R-3.8 as manufactured by Owens Corning, or approved equal.

 - 3. All insulation shall comply with 2021 International Building Code, Section 719.

07 61 00 SHEET METAL ROOFING

1.1 SECTION INCLUDES

- A. Pre-formed, pre-finished metal roofing, metal siding and flashings.
- B. Miscellaneous trim, flashing, closures, drip flashings, and accessories.
- C. Sealant
- D. Fastening devices

1.2 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel Framing
- B. Section 05 50 00 – Metal Fabrications
- C. Section 06 10 00 – Rough Carpentry
- D. Section 07 62 00 – Sheet Metal Flashing and Trim
- E. Section 07 92 00 – Joint Sealants

1.3 REFERENCES (Latest Editions)

- A. American Iron and Steel Institute (AISI) Specification for the Design of Conformed Steel Structural members.
- B. ASTM A-515 – Steel Sheet, Zinc-Coated (galvanized)
- C. ASTM E-282
- D. ASTM E-331
- E. ASTM E-330 (Modified)
- F. Spec Data Sheet – Galvalume Sheet Metal by Bethlehem Corp.
- G. SMACNA – Architectural Sheet Metal Manual
- H. Building Materials Directory – UL Test Procedure 580
- I. ASTM-E-1592

1.4 ASSEMBLY DESCRIPTION

- A. The roofing and siding assembly includes flat sheet metal panels, accessories, valleys, hips, ridges, eaves, corners, rakes, miscellaneous flashing and anchoring devices.

1.5 SUBMITTALS

- A. Submit detailed drawings showing layout of panels, anchoring details, joint details, trim, flashing, and accessories. Show details of weatherproofing, terminations, and penetrations of metal work.
- B. Submit a sample of each type of roof panel and siding panel complete with factory finish.
- C. Submit results indicating compliance with minimum requirements of the following performance tests:
 - 1. Air Infiltration: ASTM E 283-84
 - 2. Water Infiltration: ASTM E 331-88
 - 3. Wind Uplift: Design Speed 110 MPH ASTM E 1592

1.6 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in Architectural Steel Metal Products with ten (10) years minimum experience.
- B. No product substitution shall be permitted without meeting specifications.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Upon receipt of panels and other materials, installer shall examine the shipment for damage and completeness.
- B. Panels should be stored in a clean, dry place. One end should be elevated to allow moisture to run off.
- C. Panels with strippable film must not be stored in the open or exposed to the sun.
- D. Stack all materials to prevent damage and to allow for adequate ventilation.
- E. Marking of roof panels with lead pencils in shop or field is prohibited and will be replaced at no cost to the Owner.

1.8 WARRANTY

- A. Fluorocarbon Kynar finish shall have a twenty (20) year guarantee against cracking, peeling, deterioration and fade (not to exceed 5 N.B.S. units).
- B. Galvalume material shall have a twenty (20) year guarantee against failure due to corrosion, rupture or perforation.
- C. Applicator shall furnish guarantee covering watertightness of the roofing system for the period of two (2) years from the date of Substantial Completion. Manufacturer shall furnish weathertight warranty starting from the date of Substantial Completion for a twenty (20) year period.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Metal Roofing Systems, Inc., McElroy, MBCI, Fabral, Englert, Morin, or prior approved equal.
- B. Any substitutions must fully comply with specified requirements.
- C. **Basis of Design:**
 - 1. **Metal Roofing:** Basis of Design: Metal Roofing Systems, Inc.'s System 2500 2" single lock 16" panel, 24 gauge, mechanically seamed.

2.2 SHEET MATERIALS

- A. Unfinished metal shall be ASTM A446 Grade C G90 Coating ASTM 525 Hot-Dipped Galvanized or Galvalume ASTM 792. Latest Editions.
- B. Pre-finished metal shall be Hot-Dipped Galvanized ASTM A446 Grade C G90 Coating A525 24 Gauge core steel or pre-finished Galvalume ASTM 792.
- C. Finish shall be full strength Kynar 500 Fluorocarbon coating, applied by the manufacturer on a continuous coil coating line, with a top side dry film thickness of 0.70 to 0.90 mil over 0.25 to 0.35 mil prime coat, to provide a total dry film thickness of 0.90 to 1.10 mil. Bottom side shall be coated with primer with a dry film thickness of 0.25 mil. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the Kynar 500 finish supplier.

- D. Strippable film shall be liquid applied to the top side of the painted coil to protect the finish during fabrication, shipping and field handling. This strippable film must be removed before installation.

2.3 ACCESSORY MATERIALS

- A. **Fasteners:** Fasteners used are not to void the manufacturer's warranty.
- B. **Flashings, Caps, Gutters and Trim:** Standard flashings and trim profiles, factory formed, gauge as recommended by the manufacturer. Color and finish to match metal roofing panels.
- B. **Sealant:** As specified in Section 07 90 00

2.4 FABRICATION

- A. All exposed adjacent flashing shall be of the same material and finish as the roof panels.
- B. Hem all exposed edges of flashing on underside, 1/2 inch.

2.5 PRE-FORMED METAL ROOFING

- A. Standing Seam Metal Panels
 - 1. Panels shall have minimum 2" high vertical legs, spaced a minimum of 16" O.C.
 - 2. Panels shall be roll formed in continuous lengths.
 - 3. Standing seam panels to be mechanically seamed.
 - 4. Concealed anchor clips to be spaced to meet uplift requirements of the building code, but in no case more than 24" O.C.
 - 5. Color shall be selected by the Architect from the manufacturer's standard colors. Minimum number of available colors will be 15.
 - 6. Panels shall be a minimum of 24 gauge galvanized.
 - 7. Panels shall be striated to minimize oil canning.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer' standard instructions and conform to standards set forth in the NRCA Manual, 5th Edition, in order to achieve a watertight installation.
- B. Install panels so that all lines are true/level and plumb.
- C. Install fascia and edge trim before installing roof panels.
- D. Remove protective strippable film prior to installation of roof panels.
- E. Attach panels using manufacturer's standard clips, fasteners, and bearing plates, spaced in accordance with approved shop drawings.
- F. Install sealants for pre-formed roofing panels as required.
- G. Do not allow panels or trim to come in contact with dissimilar materials.
- H. Do not allow traffic on completed roof.
- I. Protect installed roof panels and trim from damage caused by adjacent construction until completion of installation.
- J. Remove and replace any panels damaged beyond successful repair.
- K. No exposed fasteners will be allowed.

3.2 CLEANING

- A. Clean any grease, finger marks or stains from the panels per manufacturer's recommendations.
- B. Remove all scrap and construction debris from the site.

07 62 00 SHEET METAL FLASHING AND TRIM

- A. The Contractor shall furnish all sheet metal work as required. Install flashing in accordance with details and specifications as described in the handbook *Sheet Copper Application* as published by the Copper Development Association.
1. **Exposed flashing:** .019" aluminum (match siding and roofing finish color where flashing is in contact with either).
 2. **Concealed flashing:** .019" aluminum.
 3. **Flashing through roof:** All pipes, metal chimneys, vents, etc. passing through the roof shall have base flashing and counter-flashing furnished and installed by the contractor installing the roof.
 4. All concealed flashing shall contain water tight dams where applicable.
 5. **Dissimilar metals:** Where dissimilar metals come in contact with each other, paint each surface with a heavy coat of asphalt paint or otherwise insulate from each other to prevent galvanic action.

END OF DIVISION 07

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SECTION 07 44 00 - CEMENTITIOUS PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Section includes fiber cement panels, battons, lap siding, trim, soffit, self adhering flashing, flexible flashing, and accessories.

1.2 RELATED SECTIONS

- A. Section - Carpentry.
- B. Section - Rough Carpentry.
- C. Section - Insulation.

1.3 REFERENCES

- A. ASTM International (ASTM):
 1. ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
 2. ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
 3. ASTM C834 - Standard Specification for Latex Sealants.
 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 5. ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
 6. ASTM D523 - Standard Test Method for Specular Gloss.
 7. ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.
 8. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
 9. ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.
 10. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 11. ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test.
 12. ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.
 13. ASTM D4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.
 14. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

15. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
 16. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
 17. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
 18. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure
- B. AATCC127 - Water Resistance: Hydrostatic Pressure Test.
- C. TAPPI - T460 - Air Resistance of Paper (Gurley Method).

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Installation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Manufacturer's best practice guide.
 4. Technical data sheet.
 5. Standard CAD drawings
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques
1. Finish areas designated by Architect.
 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 3. Refinish mock-up area as required to produce acceptable work.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Manufacturer's Warranty: Provide Hardie Limited Product Warranty, with 30-year limited product warranty against manufacturing defects.
 1. Application Warranty: Application limited warranty for 2 years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. James Hardie Products or prior approved equal.

2.2 CLADDING

- A. Hardie Plank Lap Siding – 6” w/ 4” exposure - Rustic
Hardie Trim Boards 3/4” and 4/4” - Rustic
 1. Manufacturer's Climate Zone Product: HZ10 for hot humid and wet climates with a yellow tint primer.
- B. Code Compliance Requirement for Siding Materials:
 1. Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.
 2. Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.
 3. Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
 4. Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.
 5. Fiber-cement siding, tested to ASTM E330 for Transverse Loads.

6. Intertek Warnock Hersey Product Listing.
7. Manufacturer's Technical Data Sheet.

2.3 WEATHER BARRIER

- A. Weather Barrier: James Hardie Hardie Wrap and Hardie Wrap Flashing and Seam Tapes.
- B. Code Compliance Requirement for Weather Barrier:
 1. Thickness, 11 mil sheet.
 2. Breathability in accordance with ASTM E96.
 3. Tear strength in accordance with ASTM D1117.
 4. Water resistance in accordance with AATCC127.
 5. Air Penetration in accordance with TAPPI - T460.
 6. Hardie Wrap Weather Barrier ICC-ES Evaluation Report ESR-2258

2.4 ACCESSORIES

- A. Trims: Reveal Trims in the following profiles supplied by James Hardie. Aluminum alloy 6063-T5 with a minimum thickness of 0.050 inch. All reveal trims are 8 feet in length.
 1. Surround horizontal trim.
 2. Surround vertical trim.
 3. Surround horizontal end cut transition trim.
 4. Surround outside corner trim.
 5. Surround inside corner trim.
 6. Surround J channel trim.
 7. Surround drainage flashing.
 8. Recess horizontal trim.
 9. Recess vertical trim.
 10. Recess horizontal edge trim.
 11. Recess vertical F-trim.
 12. Recess outside corner trim.
 13. Recess drainage flashing.
- B. Finishes of Reveal Trims:
 1. Primed for field painting; coating tested to ASTM D3363, ASTM D3359, D2794, D4585, D523, and D1308.
 2. Clear anodized; conforming to ASTM B244 and ASTM B136.

2.5 FASTENERS

- A. Fasteners: For attaching Hardie Reveal Panel direct to sheathing provide the following:
 1. Wood Framing, Exposed Screws: No. 10 by 0.472 inch head diameter by 1.5 inch long.
 2. Wood Framing, Countersunk Screws: No 8 by 0.39 inch head diameter

- by 1-5/8 inch long
- 3. Steel Framing, Exposed Screws: No. 10 by 0.472 inch head diameter by 1.25 inch long.
- 4. Steel Framing, Countersunk Screws: No. 8 by 0.39 inch head diameter by 1-5/8 inch long.
- 5. Fasteners shall be of high quality stainless steel to ensure resistance to corrosion. For field painting, fasteners shall be treated to accept paint adhesion.
 - a. Alternatives must be approved by the architect. e.g. decorative screws, nails, bugle head screws, and similar items.

2.6 FINISHES

- A. Factory Primer: Provide factory applied universal primer.
 - 1. Primer: Factory applied sealer/primer by James Hardie. Apply flat sheen finishes to panels.
 - 2. Topcoat: Refer to Section 09 90 00 - Painting and Coating and Exterior Finish Schedule.
- B. Factory Finish for Trim:
 - 1. Trim for Factory-Applied Coating and Field-Applied Finish: Chem Film.
 - 2. Trim for Factory-Applied Finish and No Field-Applied Finish: Clear anodized.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Ensure that drainage plane is intact and all penetrations are sealed.

3.3 INSTALLATION

- A. Wood Framing: Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required.

Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.

1. Install water-resistive barriers and claddings to dry surfaces.
2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
3. Protect siding from other trades.

B. Installation: Install materials in strict accordance with manufacturer's installation instructions.

1. Fastening Method: Exposed.
2. Fastening Method: Countersunk and filled.
3. Place fasteners no closer than 3/4 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
4. Use fasteners as specified in the James Hardie Tech Data sheet and in the Hardie Reveal Panel Installation Instruction.
5. Install panel using 1/2 inch (13 mm) spacers at horizontal joints. Leave bottom edge of panel above all horizontal trims exposed, no caulking shall be placed at this overlap of Horizontal Reveal Trim. Factory primed edge shall always be used.
6. Install a kickout flashing to deflect water away from the siding at the roof intersection.
7. Install a self-adhering membrane on the wall before the subfascia and trim boards are nailed in place, and then install the kickout.
8. Allow minimum vertical clearance between the bottom edge of siding and any other material in strict accordance with the manufacturer's installation instructions and as determined by James Hardie Zone.
9. Maintain clearance between siding and adjacent finished grade.
10. Specific framing and fastener requirements - refer to the applicable building code compliance reports.

3.4 FINISHING

- A. Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic exterior flat grade paint with flat finish within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.
- B. Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

DIVISION 08 OPENINGS

08 11 13 HOLLOW METAL DOORS AND FRAMES

- A. Furnish and install hollow metal frames as shown on drawings and as specified herein. See drawings and schedule for types, sizes, design and location of hollow metal frames and accessories.
- B. Hollow metal frames shall be manufactured by Steelcraft, Cincinnati, Ohio or approved equal as conforming ANSI ICC A117.1-2017 and the Americans with Disabilities Act of 1991.
- C. Underwriter's Labels: Provide door and/or frames with labels of Underwriters' Laboratories, Inc. where required in Door Schedule on drawings. Labels shall indicate compliance with class required in schedule and shall be furnished with metal labels securely attached to the door. Plastic or paper labels are not permitted on this project.
- D. **Materials:**
 - 1. Steel shall be commercial quality, carbon steel sheets free from scale, pitting and surface defects. Gauges shall be U.S. Standard.
 - 2. Steel for face sheets for broad frame faces shall be stretcher-leveled.
 - 3. Sheet steel for exposed surfaces of frame for exterior openings shall be hot-dipped galvanized, phosphatized steel sheet with not less than light commercial zinc coating in accordance with ASTM A 526-71.
 - 4. Steel shall have a shop coating of the manufacturer's standard rust-inhibitive baked primer over phosphatizing treatment.
- E. **Fabrication:**
 - 1. Fabricate all frame shapes as shown on drawings. Jamb widths as required.
 - 2. Frames shall be manufactured of cold-rolled steel except where shown otherwise in the Contract Documents. Fabricate frames from 16 gauge steel except where required otherwise in Contract Documents.
 - 3. Corner joints shall have contact edges closed tight. Grind exposed welds smooth and with no depressions.

4. At hardware locations, install reinforcing plates.
5. Provide a minimum of 3 anchors in each jamb. Anchors shall be 14 gauge steel. Anchors shall be appropriate type for wall material.
6. Before shipment, install a temporary spreader at bottom of frames. Do not remove until frames are secured in place.

F. **HOLLOW METAL DOORS:**

1. Doors shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A 366 or hot-rolled, pickled and oiled steel conforming to ASTM A 569 and free of scale, pitting or surface defects.
2. **Interior Doors:** Face sheets shall be not less than 18 gauge.
3. **Exterior Doors:** Face sheets shall be not less than 18 gauge and shall have a zinc coating applied by the hot-dip process conforming to ASTM A526 (A60 or G60) with a coating weight of not less than 0.60 ounces per square foot (0.30 per square foot per side).
4. All doors shall be of the types and sizes shown on approved submittal drawings and shall be constructed in accordance with the specifications.
5. Door face sheets shall be joined at their vertical edges with no visible seams on their faces. Minimum door thickness shall be 1-3/4".
6. Face sheets shall be stiffened by polystyrene core or 22 gauge steel stiffeners welded in place no more than 6 inches apart with the void between the stiffeners filled with fiberglass insulation.
7. Top and bottom edges of all doors shall be closed and continuous steel channels not less than 16 gauge, spot welded to both faces.
8. **Hardware reinforcements:**
 - a. Doors shall be mortised, reinforced at the factory for fully templated mortised hardware only, in accordance with the approved hardware schedule and templates provided by the hardware supplier. Where surface mounted or non-templated hardware is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by others.

- b. Minimum guage for hardware reinforcing plates shall be as follows:
- Full mortise hinges and pivots - 7 guage
 - Reinforcements for lock face, flush bolts - 14 guage
 - Reinforcements fr all other surface mounted hardware - 16 guage
9. **Finish:** After fabrication, all tool marks and surface blemishes shall be filled and sanded as required to make both faces and both vertical edges smooth and free from irregularities. After appropriate preparation, all exposed surfaces shall receive a rust inhibitive primer which meets or exceeds ASTM B 117 salt spray for 150 hours and whcih is fully cured prior to shipment.

08 71 00 DOOR HARDWARE

- A. **HARDWARE ALLOWANCE:** The Contractor shall allow \$1,400.00 (ONE THOUSAND FOUR HUNDRED DOLLARS) for the purchase, delivery and installation of finish door hardware.
- B. **SUBMITTALS**
 - 1. Product Data: Submittal data shall include installation and maintenance instructions for operating parts and finish.
 - 2. Hardware submittal shall be organized into “hardware sets” indicating complete designations of every item required for each door or opening, including:
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of hard set cross-referenced to indications on drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
- C. Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g. Hollow metal frames) which is critical in the project construction schedule.
- D. **Templates:** Furnish for the installation of all hardware and to the manufacturer of related equipment for his preparation of that equipment for all hardware that must be attached thereto. Templates shall also be furnished to the manufacturer of wood doors for use on all wood doors that are factory fitting and factory machined for hardware.
- E. Submit separate detail schedule indicating clearly how the Owner’s final instruction on keying of locks has been fulfilled.

END OF DIVISION 08

SECTION 09 91 00 PAINTS AND COATINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior Paint Systems: Surface preparation and field painting of exposed exterior items and surfaces.
- B. Interior Paint Systems: Surface preparation and field painting of exposed interior items and surfaces.
- C. Interior stain and natural finish woodwork systems.
- D. Exterior High Performance Coating Systems: Surface preparation and field application of exterior high-performance coating systems to items and surfaces scheduled.
- E. Interior High Performance Coating Systems: Surface preparation and field application of interior high-performance coating systems to items and surfaces scheduled.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing.
- C. Section 05 50 00 - Metal Fabrications.
- D. Section 06 20 00 - Finish Carpentry.
- E. Section 08 11 13.13 - Standard Hollow Metal Doors and Frames.
- F. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.
- G. Section 22 05 00 - Common Work Results for Plumbing.
- H. Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM) D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- B. Steel Structures Painting Council (SSPC) SP6 - Commercial Blast Cleaning Procedures.

- C. Steel Structures Painting Council (SSPC) SP10 - Near White Blast Cleaning Procedure.

1.4 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16.
 - 1. Flat: lusterless or matte. Gloss Range: Max 15 measured at 85 degree meter.
 - 2. Eggshell: Low-sheen. Gloss Range: 20 to 35 measured at 60 degree meter.
 - 3. Semi-Gloss: Medium-sheen. Gloss Range: 35 to 70 measured at 60 degree meter.
 - 4. Full Gloss: High-sheen. Gloss Range: Above 70 measured at a 60 degree meter.

- B. Environments: The following terms distinguish between different corrosive exposures:
 - 1. Severe Environments: Highly corrosive industrial atmospheres. Sustained exposure to high humidity and condensation and with frequent cleaning using strong chemicals. Environments with heavy concentrations of strong chemical fumes and frequent splashing and spilling of harsh chemical products are severe environments.
 - 2. Moderate Environments: Corrosive industrial atmospheres with intermittent exposure to high humidity and condensation, occasional mold and mildew development, and regular cleaning with strong chemicals. Environments with exposure to heavy concentrations of chemical fumes and occasional splashing and spilling of chemical products are moderate environments.
 - 3. Mild Environment: industrial atmospheres with normal exposure to moderate humidity and condensation, occasional mold and mildew development, and infrequent cleaning with strong chemicals. Environments with low levels of mild chemical fumes and occasional splashing and spilling of chemical products are mild environments. Normal outdoor weathering is also considered a mild environment.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

- B. Product Data: For each paint system indicated, including:
 - 1. Material List: An inclusive list of required coating materials. Indicate each material and cross reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Preparation instructions and recommendations.
 - 3. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

- C. Selection Samples: For each finish product specified, two complete sets of color

chips representing manufacturer's full range of available colors and patterns.

- D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.
- C. Paint exposed surfaces. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
- D. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label:
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- C. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).

- D. Do not apply paint in snow, rain, fog, or mist: or when relative humidity exceeds 85 percent: or at temperatures less than 5 deg F (3 deg C) above the dew point: or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

1.9 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Quantity: Furnish Owner with an additional three percent, but not less than 1 gal (3.8 l) or 1 case, as appropriate, of each material and color applied.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: PPG Architectural Finishes, Sherwin Williams, or prior approved equal.
- B. Basis of Design: PPG Paints as manufactured and supplied by PPG Architectural Finishes, Incorporated.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 PAINT MATERIALS - GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that meet the applicable local, state or federal VOC requirements.
- C. Color: Refer to Finish Schedule and Paint Legend for paint colors.

2.3 EXTERIOR PAINT SYSTEMS

- A. Concrete, Stucco, and Masonry (Other Than Concrete Masonry Units): Provide the following finish systems over exterior concrete, stucco, and brick masonry substrates.
 - 1. Acrylic Finish: Two finish coats over a primer.
 - a. Primer: PPG Paints. 4-603XI PERMA-CRETE Interior/Exterior Alkali

- Resistant Primer. Applied Dry Film Thickness: 1.4 mils min.
 - b. Exterior Flat Acrylic Finish: PPG Paints. 6-610XI Series Speedhide Exterior House Paint Flat Latex. Applied Dry Film Thickness: 1.3 mils min.
 - c. Exterior High Build Flat Acrylic Finish: PPG Paints. 4-22XI Series Perma-Crete High Build 100 Percent Acrylic Topcoat. Applied Dry Film Thickness: 3.2 mils min.
 - d. Exterior Eggshell Acrylic Finish: PPG Paints. 6-2045XI Series Speedhide Exterior House and Trim Satin-Acrylic Latex. Applied Dry Film Thickness: 1.0 mil min.
 - e. Exterior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 6-900XI Series Speedhide Exterior House and Trim Semi-Gloss Acrylic Latex Paint. Applied Dry Film Thickness: 1.5 mils min.
 - f. Exterior Acrylic Texture Finish: PPG Paints. 4-50 Series Perma-Crete 100 Percent Acrylic Texture Coating. Applied Dry Film Thickness: 6.8 mils min.
- B. Concrete Masonry Unit: Provide the following finish systems over exterior concrete masonry units.
 - 1. Acrylic Finish: Two finish coats over a block filler.
 - a. Block Filler: PPG Paints. 6-15XI Speedhide Interior/Exterior Acrylic Masonry Block Filler. Applied Dry Film Thickness: 8.0 mils min.
 - b. Exterior Flat Acrylic Finish: PPG Paints. 6-610XI Series Speedhide Exterior House Paint Flat Latex. Applied Dry Film Thickness: 1.3 mils min.
 - c. Exterior Eggshell Acrylic Finish: PPG Paints. 6-2045XI Series Speedhide Exterior House and Trim Satin-Acrylic Latex. Applied Dry Film Thickness: 1.0 mil min.
 - d. Exterior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 6-900XI Series Speedhide Exterior House and Trim Semi-Gloss Acrylic Latex Paint. Applied Dry Film Thickness: 1.5 mils min .
- C. Wood Trim: Provide the following finish systems over exterior wood trim.
 - 1. Acrylic or Alkyd Finish: Two finish coats over a primer.
 - a. Primer: PPG Paints. 17-921XI Series Seal Grip 100 Percent Acrylic Universal Primer. Applied Dry Film Thickness. 1.6 mils min.
 - b. Exterior Eggshell Acrylic Finish: PPG Paints. 6-2045XI Series Speedhide Exterior House and Trim Satin-Acrylic Latex. Applied Dry Film Thickness: 1.0 mils min.
 - c. Exterior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 6-900XI Series Speedhide Exterior House and Trim Semi-Gloss Acrylic Latex Paint. Applied Dry Film Thickness: 1.5 mils min.
- D. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
 - 1. Acrylic or Alkyd Finish: Two finish coats over a rust-inhibitive primer.

- a. Primer/Flat Acrylic Finish: PPG Paints. 4020 PF Pitt-Tech Plus Interior/Exterior Waterborne Acrylic Primer Finish. Applied Dry Film Thickness: 2.2 mils min.
 - b. Exterior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 4216 HP Series Pitt-Tech Plus Interior/Exterior high performance waterborne Semi-Gloss DTM Enamel. Applied Dry Film Thickness: 1.5 mils min.
 - c. Exterior Semi-Gloss Alkyd Enamel Finish: PPG Paints. 4336H Series HPC Urethane Alkyd Semi-Gloss Enamel. Not Compliant in OTC Phase II, CARB 2007, SCAQMD, CT, DE, MD and UT Air Quality Districts. Applied Dry Film Thickness: 2.0 mils min.
- E. Aluminum: Provide the following finish systems over exterior aluminum surfaces.
- 1. Acrylic or Alkyd Finish: Two finish coats over a primer.
 - a. Primer/Flat Acrylic Finish: PPG Paints. 4020 PF Pitt-Tech Plus Interior/Exterior Waterborne Acrylic Primer Finish. Applied Dry Film Thickness: 2.2 mils min.
 - b. Exterior Satin Acrylic Enamel Finish: PPG Paints. 90-1110 Series Pitt-Tech Plus Interior/Exterior Satin DTM Industrial Enamel. Applied Dry Film Thickness: 2.0 mils min.
 - c. Exterior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 4216 HP Series Pitt-Tech Plus Interior/Exterior high performance waterborne Semi-Gloss DTM Enamel. Applied Dry Film Thickness: 1.5 mils min.

2.4 INTERIOR PAINT SYSTEMS

- A. Concrete Unit Masonry: Provide the following finish systems over interior concrete masonry.
- 1. Acrylic or Alkyd Finish: Two finish coats over a block filler.
 - a. Block Filler: PPG Paints. 6-7 Speedhide Interior/Exterior Masonry Latex Block Filler. Applied Dry Film Thickness: 6.0 to 14.0 mils min.
 - b. Interior Flat Acrylic Finish-Zero VOC: PPG Paints. 6-4110XI Series Speedhide zero Interior Zero VOC Flat Latex. Applied Dry Film Thickness: 1.4 mils min.
 - c. Interior Eggshell Acrylic Enamel Finish-Zero VOC: PPG Paints. 6-4310XI Series Speedhide zero Interior Zero VOC Eggshell Latex. Applied Dry Film Thickness: 1.5 mils min.
 - d. Interior Semi-Gloss Acrylic Enamel-Zero VOC: PPG Paints. 6-4510XI Series Speedhide zero Interior Zero VOC Semi-Gloss Latex. Applied Dry Film Thickness: 1.3 mils min.
- B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces.
- 1. Acrylic or Alkyd Finish: Two finish coats over a primer.
 - a. Primer-Zero VOC: PPG Paints. 6-4900XI Speedhide zero Interior Zero VOC Latex Primer. Applied Dry Film Thickness: 1.2 mils min.
 - b. Interior Flat Acrylic Finish-Zero VOC: PPG Paints. 6-4110XI Series

- Speedhide zero Interior Zero VOC Flat Latex. Applied Dry Film Thickness: 1.4 mils min.
- c. Interior Eggshell Acrylic Enamel Finish-Zero VOC: PPG Paints. 6-4310XI Series Speedhide zero Interior Zero VOC Eggshell Latex. Applied Dry Film Thickness: 1.5 mils min.
 - d. Interior Eggshell Water-Based Epoxy Finish: PPG Paints. 16-310 Series Pitt Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy. Applied Dry Film Thickness: 1.5 mils min.
 - e. Interior Semi-Gloss Acrylic Enamel-Zero VOC: PPG Paints. 6-4510XI Series Speedhide zero Interior Zero VOC Semi-Gloss Latex. Applied Dry Film Thickness: 1.3 mils min.
 - f. Interior Semi-Gloss Water-Based Epoxy Finish: PPG Paints. 16-510 Series Pitt Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy. Applied Dry Film Thickness: 1.5 mils min.
- C. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces.
1. Acrylic or Alkyd Finish: Two finish coats over a primer.
 - a. Primer for Acrylic-Enamel Finishes: PPG Paints. 17-921XI Series Seal Grip 100 Percent Acrylic Universal Primer. Applied Dry Film Thickness: 1.6 mils min.
 - b. Interior Semi-Gloss Acrylic Enamel-Zero VOC: PPG Paints. 6-4510XI Series Speedhide zero Interior Zero VOC Semi-Gloss Latex. Applied Dry Film Thickness: 1.3 mils min.
- D. Ferrous Metal: Provide the following finish systems over ferrous metal.
1. Acrylic or Alkyd Finish: Two finish coats over a primer.
 - a. Primer/Flat Acrylic Finish: PPG Paints. 4020 PF Pitt-Tech Plus Interior/Exterior Waterborne Acrylic Primer Finish. Applied Dry Film Thickness: 2.2 mils min.
 - b. Interior Satin Acrylic Enamel Finish: PPG Paints. 90-1110 Series Pitt-Tech Plus Interior/Exterior Satin DTM Industrial Enamel. Applied Dry Film Thickness: 2.0 mils min.
 - c. Interior Semi-Gloss Acrylic Enamel-Zero VOC: PPG Paints. 6-4510XI Series Speedhide zero Interior Zero VOC Semi-Gloss Latex. Applied Dry Film Thickness: 1.3 mils min.
 - d. Interior Semi-Gloss Acrylic Enamel Finish: PPG Paints. 4216 HP Series Pitt-Tech Plus Interior/Exterior high performance waterborne Semi-Gloss DTM Enamel. Applied Dry Film Thickness: 1.5 mils min.
 2. Dry Fall Finish: Two finish coats over a primer.
 - a. Primer/Flat Acrylic Finish: PPG Paints. 4020 PF Pitt-Tech Plus Interior/Exterior Waterborne Acrylic Primer Finish. Applied Dry Film Thickness: 2.2 mils min.
 - b. Interior Water-Based Flat Finish: PPG Paints. 6-725XI Series Speedhide Super Tech WB Interior Dry-Fog Flat Latex. Applied Dry Film Thickness: 2.2 mils min.

- c. Interior Water-Based Eggshell: PPG Paints. 6-724XI Speedhide Super Tech WB Interior 100 percent Acrylic Dry-Fog Eggshell Latex. Applied Dry Film Thickness: 2.0 mils min.
- d. Interior Water-Based Semi-Gloss: PPG Paints. 6-727XI Speedhide Super Tech WB Interior 100 percent Acrylic Dry-Fog Semi-Gloss Latex. Applied Dry Film Thickness: 2.2 mils min.

2.5 INTERIOR STAIN AND NATURAL FINISH WOODWORK SYSTEMS

- A. Stained Woodwork: Provide the following stained finishes over new interior woodwork.
 - 1. Alkyd Varnish Finish over Stain: Two finish coats of alkyd-based clear varnish over a sealer coat and wood stain. Wipe wood filler before applying stain.
 - a. Filler Coat: Open-Grain Wood Filler.
 - 2. Waterborne Varnish Finish over Stain: Two finish coats of waterborne clear varnish over a sealer coat and wood stain. Wipe wood filler before applying stain.
 - a. Stain Coat: Def. DFT300 Water-Based Wood Stain.
 - b. Sealer Coat: Def. DFT61 Sanding Sealer Interior Water-Based.
 - c. Finish Coats: Def. DFT159 Clear Polyurethane Interior Water-Based Acrylic Satin.
 - d. Finish Coats: Def. DFT158 Clear Polyurethane Interior Water-Based Acrylic Semi-Gloss.
 - e. Finish Coats: Def. DFT157 Clear Polyurethane Interior Water-Based Acrylic Gloss.

2.6 EXTERIOR HIGH PERFORMANCE COATING SYSTEMS

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous-metal surfaces:
 - 1. Epoxy with Urethane Finish: One finish coat over an intermediate coat and a primer.
 - a. Primer: PPG Paints. AK2V-3 Series Amerlock 2 VOC Fast Dry, High Solids Semi-Gloss Epoxy Coating. Applied Dry Film Thickness: 4.0 mils min.
 - b. Intermediate Coat: Aliphatic Polyurethane Enamel: PPG Paints: 95-8801/95-859 Series Pitthane High Build Semi-Gloss Urethane Enamel. Not Compliant in OTC Phase II, CARB 2007, SCAQMD, CT, DE, MD and UT Air Quality Districts. Applied Dry Film Thickness: 2.0 mils min.
 - 2. Fluoropolymer System: One finish coat applied over an epoxy primer.
 - a. Primer: PPG Paints. Corafon ADS Epoxy Primer ADS 573/ADS574. Not Compliant in SCAQMD. Applied Dry Film Thickness: 3.0 mils min.
 - b. Finish: PPG Paints. Corafon ADS Fluoropolymer. Not Compliant in SCAQMD. Apply per instructions on the technical data bulletin. Metallic finishes may require an additional clear coat of Corafon ADS.

2.7 INTERIOR HIGH PERFORMANCE COATING SYSTEMS

- A. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry block:
 - 1. Epoxy with Urethane Finish: One finish coat over an intermediate coat and a block filler.
 - a. Block Filler: PPG Paints. Amerlock 400BF Epoxy Block Filler. Applied Dry Film Thickness: 4.0 mils min.
 - b. Intermediate Coat: PPG Paints. 97-1212/97-139 Series Aquapon High Build Semi-Gloss Polyamide Epoxy Coating. Not Compliant in OTC Phase II, CARB 2007, SCAQMD, CT, DE, MD and UT Air Quality Districts. Applied Dry Film Thickness: 4.0 mils min.
 - c. Intermediate Coat: PPG Paints. AK2V-3 Series Amerlock 2 VOC Fast Dry, High Solids Semi-Gloss Epoxy Coating. Applied Dry Film Thickness: 4.0 mils min.
- B. Ferrous Metal: Provide the following finish systems over interior ferrous-metal surfaces:
 - 1. Epoxy with Urethane Finish: One finish coat over an intermediate coat and a primer.
 - a. Primer: PPG Paints. AK2V-3 Series Amerlock 2 VOC Fast Dry, High Solids Semi-Gloss Epoxy Coating. Applied Dry Film Thickness: 4.0 mils min.
 - b. Intermediate Coat: PPG Paints. AK2V-3 Series Amerlock 2 VOC Fast Dry, High Solids Semi-Gloss Epoxy Coating. Applied Dry Film Thickness: 4.0 mils min.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.
 - 2. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:
 - a. Confirmation of primer's suitability for expected service conditions.
 - b. Confirmation of primer's ability to be top coated with materials specified.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Provide barrier coats over incompatible primers or remove primers and reprime substrate.
 - 3. Cementitious Substrates: Prepare concrete, brick, concrete masonry block, and cement plaster surfaces to be coated. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
 - a. Use abrasive blast-cleaning methods if recommended by coating manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 - 4. Wood Substrates: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Smoothly sand surfaces exposed to view and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer, before applying primer.
 - b. Immediately on delivery, prime edges, ends, faces, undersides, and backsides of wood to be coated.
 - c. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 5. Ferrous Metal Substrates: Clean ungalvanized ferrous-metal surfaces that have not been shop coated: remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC recommendations.

- a. Blast-clean steel surfaces as recommended by coating manufacturer and according to SSPC-SP 10.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire brush, solvent clean, and touch up with same primer as the shop coat.
6. Nonferrous-Metal Substrates: Clean nonferrous and galvanized surfaces according to manufacturer's written instructions for the type of service, metal substrate, and application required.
- a. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Material Preparation: Carefully mix and prepare coating materials according to manufacturer's written instructions.
- 1. Maintain containers used in mixing and applying coatings in a clean condition, free of foreign materials and residue.
 - 2. Stir materials before applying to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into the material. Remove film and, if necessary, strain coating material before using.
 - 3. Use only the type of thinners approved by manufacturer and only within recommended limits.
 - 4. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
- B. General: Apply high-performance coatings according to manufacturer's written instructions.
 - 1. Use applicators and techniques best suited for the material being applied.
 - 2. Do not apply high-performance coatings over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to forming a durable coating film.
 - 3. Coating surface treatments, and finishes are indicated in the coating system descriptions.
 - 4. Provide finish coats compatible with primers used.
 - 5. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, grilles, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
- C. Application Procedures: Apply coatings by brush, roller, spray, or other applicators

according to manufacturer's written instructions.

1. The number of coats and film thickness required is the same regardless of application method.
2. Completed Work: Match approved Samples for color, texture, and coverage. Remove, refinish, or recoat work that does not comply with specified requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 2. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove noncomplying paint from Project site, pay for testing, and repaint surfaces previously coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. After completing painting, clean glass and paint spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
- C. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces.

END OF SECTION

DIVISION 10 SPECIALTIES

10 14 00 SIGNAGE

- A. Allow ONE HUNDRED DOLLARS (\$100.00) for the purchase, delivery and installation of the interior signage package.
- B. Signage allowance shall include interior ADA signage for restrooms.

10 28 00 TOILET, BATH AND LAUNDRY ACCESSORIES

- A. Stainless steel angle-frame mirrors B-165-1830 by Bobrick or approved equal installed in each lavatory – see drawings for number required.
- B. Furnish and install grab bars where shown on drawings.
 - 1. Grab bars shall be installed as required by ANSI A117.1 - 2003 Edition and the Americans With Disabilities Act of 1991.
 - 2. Bars shall be exposed to mounting type B-6106 series (length as required by ANSI A117.1 - 2003 Edition) as manufactured by Bobrick or approved equal. Bars shall be 1 1/2 “ diameter with peened non-slip gripping surface and satin finish flange and grab bar in stainless steel.
- C. Sanitary napkin depository bin shall be stainless steel B-270 by Bobrick or approved equal. Install in Ladies Restrooms – see drawings for number required.

END OF DIVISION 10

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